Armando Martinez
Operations Lead, Portfolio Operations Central

October 20, 2021

New Mexico Oil Conservation Division – District I
1625 N. French Drive
Hobbs, New Mexico 88240

Re: Vacuum Glorieta West Unit Satellite 2
Deferral Request Report
NMOCD Case No. 1RP-3263
Lea County, New Mexico

Dear Bradford Billings:

Chevron Environmental Management Company (CEMC) submits herein the *2019 Site Assessment Report* for 1RP-3263, Vacuum Glorieta West Unit Satellite 2. The Report was prepared by Arcadis U.S., Inc. (Arcadis), on behalf of CEMC. Based on the data presented in this Report, and concurrence from the NMOCD, no further assessments or additional cleanup actions are required at the Site until after abandonment of the facility. A deferral status is requested for the Site.

If you have any questions regarding this submittal, please contact Scott Foord of Arcadis at (713) 953-4853 or me at (505) 690 5408.

Respectfully,

Armando Martinez

Encl. 2019 Site Assessment Report – Deferral Request - Vacuum Glorietta West Unit Satellite 2

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Chevron Environmental Management Company

2019 SITE ASSESSMENT REPORT

Vacuum Glorieta West Unit (VGWU)
Satellite 2 (VGSU SAT 2)
Section 25, Township 17 South, Range 34 East
Lea County, New Mexico

OGRID No. 4323
Case No. 1RP-3263

July 2020

Ryan Nanny
Project Geologist

Scott Foord, P.G.
Certified Project Manager

2019 SITE ASSESSMENT REPORT

VGWU SAT 2

Prepared for:
Armando Martinez
Operations Lead Central
Chevron Environmental Management Company
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Prepared by:
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Our Ref.:
30037736

Date:
July 2020

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APPENDICES

1 INTRODUCTION

Arcadis U.S., Inc. (Arcadis) submits herein, on behalf of Chevron Environmental Management Company (CEMC), this Site Assessment Report (Report) which summarizes geophysical and shallow soil assessment activities conducted in 2019 at the Vacuum Glorieta West Unit (VGWU) Satellite 2 (VGWU SAT 2) (Site). These activities were conducted in response to a release of approximately 5 barrels (bbls) of produced water and 0.5 bbls of oil on October 15, 2012. Data presented in this report was collected during the November 2019 site assessment event.

The Site is in the NW 1/4 of the SE 1/4 of Section 25, Township 17 South, Range 34 east of Lea County, New Mexico. Latitude and longitude coordinates for the Site are 32° 48’ 28.27” N and 103° 30’ 48.48” W.

The Site is in the western edge of the Permian Basin, a 75,000-square-mile area in west Texas and New Mexico that is populated by oil and gas production wells. In New Mexico, the Permian Basin extends to Roosevelt County to the north and Chaves County to the west. Lovington (the closest town) is approximately 14.5 miles northeast of the Site and the closest agricultural area is approximately 8 miles northeast of the Site. A Site Location Map is presented as **Figure 1**. A Site Detail Map is presented as **Figure 2**. Additional Site background information is provided in **Appendix A**.

2 2019 GEOPHYSICAL SURVEY

On November 20, 2019, Arcadis performed an electromagnetic conductivity survey over accessible areas of the Site covering approximately 1 acre (**Figures 3** through **5**). The objective of the survey was to determine background electrical conductivity (EC) response and identify EC anomalies within the surveyed area to assess the lateral extent of possible produced water-related soil and impacts.

The particularly high electrical conductivity of oil field production water makes the detection of produced water-related soil impacts by geophysical methods sensitive to the electrical conductivity of soil and groundwater a reliable approach. There are several methods that can be used for quantifying the EC of soil and groundwater, but a class of instruments which utilize the concept of electromagnetic induction to measure EC are very effective in many situations. Electromagnetic (EM) instruments that operate in what is known as the frequency domain are well suited for shallow investigations. EM conductivity instruments consist of co-planar transmitter and receiver coils, and a power source that can be handled by one or two persons. During the operation of the instrument, the transmitter coil is energized by an alternating current and radiates an electromagnetic field into the earth. This transmitted primary field induces electrical currents in the earth below the instrument. The magnitude of the induced current is proportional to the EC of the earth materials beneath the instrument. The induced current flow generates a secondary electromagnetic field, phase-lagged behind the primary field, that is detected by the receiver coil on the instrument. The receiver coil also detects the primary field and uses the ratio of the secondary to primary field to calculate the EC of the earth. This reading represents a bulk EC measurement, known as the apparent EC, within a volume of ground directly beneath the instrument down to its effective depth of penetration. The penetration depth is determined by the transmitter frequency, coil separation, height of instrument off the ground surface, and orientation of the coils.

For this Site, Arcadis performed shallow-imaging EM surveys with a GEM-2 broadband electromagnetic sensor manufactured by Geophex Ltd. The GEM-2 is a digital, multi-frequency sensor capable of transmitting and receiving a digitally synthesized arbitrary waveform containing multiple frequencies. The approximate depth of exploration for a given earth medium is determined by the operating frequency of the sensor. By utilizing multiple frequencies to measure the earth response from several depths, a concept of the approximate three-dimensional distribution of subsurface materials can be created. The quad-phase and in-phase instrument response values are stored in a handheld computer for subsequent processing. Data was collected in vertical dipole mode using five discrete frequencies (93 kilohertz (kHz), 63 kHz, 18.3 kHz, 5.3 kHz, and 1.5 kHz). The higher instrument frequencies are sensitive to shallow variations in the subsurface, while the lower instrument frequencies are more sensitive to deeper variations in the subsurface.

Data was collected along lines spaced approximately 10 feet (ft) apart with nearly continuous data coverage along these lines. Positioning information was provided by a Hemisphere A100 global positioning system (GPS) receiver with dynamic, real time correction (submeter accuracy). GPS and instrument response data were simultaneously recorded in a handheld field computer. All GPS and geophysical data collected during the survey were merged into a single data file for subsequent data processing.

Once EM data sets were collected, they were transferred to a laptop computer while on-Site. The data sets were preprocessed using *WinGEM* from Geophex Ltd. and imported into *Surfer Version 16* to create relative conductivity maps. A raw plot of the GPS positions was created to verify the sufficiency of data coverage, which was verified affirmatively. Preliminary contour plots of the raw apparent conductivity data were also created while on-Site to verify that the data were within acceptable bounds and that project objectives were being met.

To further assess EC variations in the subsurface, additional GEM-2 data was collected along two south to north transect lines (A-A' and B-B') and one west to east transect line (C-C') as depicted in **Figures 3**. In order produce a more robust model, data from 13 discrete frequencies were collected along the two transect lines (93 kHz, 80kHz, 63kHz, 38.3kHz, 21.9kHz, 18.3kHz, 12.4 kHz, 5.3kHz, 2.9 kHz, 2.4kHz, 1.5 kHz, 0.63 kHz, and 0.45kHz). The data was inverse modeled using the software IX1Dv3 by Interpex to produce electrical resistivity cross-sections of the subsurface. Visualization of the modeled GEM-2 2D data at depths near the limit of the penetration of the GEM-2 instrument are less constrained with results typically displaying distortions near the base of the model.

2.1 Interpretation of Geophysical Results

Figures 3, **4** and **5** present color-filled contour maps for the 63kHz GEM2 data (4 to 8 ft. sensing depth), the 18.3kHz GEM2 data (6 to 10 ft. sensing depth), and the 5.3kHz GEM2 data (8 to 12 ft. sensing depth), respectively. **Figures 6**, **7**, and **8** present GEM-2 2D modelling results along the A-A', B-B', and C-C' profiles. Locations of metallic utility lines (electrical, gas, water, and communication lines) and 2019 shallow soil sample locations collected on the day of the geophysical survey on November 20, 2019 are denoted in **Figures 3** through **8**.

The color scale used in **Figures 3** through **8** is designed to visually portray the deviation from the background EC conditions, which are in the gray to blue green range. In contrast, anomalous areas of

high EC are shown in upper portion of the color scale, from green to yellow to red, progressively indicating higher EC, which is generally assumed to reflect proportionately higher total dissolved solid (TDS) pore fluids (produced water influence) or conductive metallic features (Site structure or subsurface utilities). Anomaly intensity and physical dimensions typically reveal whether the anomalies are due to pore fluid chemistry or metallic objects. Note that the data output for the GEM-2 model profiles presented in **Figures 6**, **7**, and **8** are in units of electrical resistivity (ohm-meters, logarithmic scale) which is the inverse quantity of electrical conductivity (mS/m). A corresponding logarithmic color scale is used in **Figures 6**, **7**, and **8** to depict areas of low electrical resistivity in the A-A', B-B', and C-C' profiles with warm colors (yellow to red) that correlate to areas of high EC in the contour maps.

An elevated EC response is observed throughout the central portion of the survey area, near metallic Sat2 infrastructure with elevated EC values >200 mS/m shown in red colors on **Figures 3** through **5**. Elevated EC responses (>200 mS/m) are observed in the norther portion of the outlined spill area extending to the west past the soil sample location VGW-SAT2-AB01. Elevated EC responses >200 mS/m are also observed in the northwest surveyed area and in the southeastern portion of the surveyed area near soil sample locations VGW-SAT2-AB04 and VGW-SAT2-AB05 in locations adjacent to metallic valves/piping. Note that sources of metallic interference to EM survey data can include large metal objects, buried cables, pipes, buildings, and metal fences. The presence of these metallic objects will effectively mask the more subtle responses attributed to produced water-related soil impacts and geologic features.

The south to north GEM-2 A-A' profile shown in **Figure 6** bisects the outlined spill area and the above mentioned central >200 mS/m EC area. The A-A' model resolves two confined “perched” high conductivity zones in the northern portion of the profile that extend from approximately 0 to 15 ft. below ground surface (bgs) around VGWU-SAT2-AB02 and from 15 to 20 ft. bgs. around VGWU-SAT2-AB06, providing some vertical delineation of the elevated EC response and suggesting that produced water impacts may not extend to deeper soils.

The south to north GEM-2 B-B' profile shown in **Figure 7** intersects the eastern edge of the high >100 mS/m EC zone near exposed valves/piping and extends northward towards soil sample location VGWU-SAT2-AB07. The B-B' model resolves a confined “perched” high conductivity zone in the northern portion of the profile that extend from approximately 0 to 30 ft. bgs.

The west to east GEM-2 C-C' profile shown in **Figure 8** bisects the outlined spill area and central and south-eastern areas displaying elevated EC responses >200 mS/m. The C-C' model resolves two discontinuous confined “perched” high conductivity zones that extend from approximately 0 to 32 ft. bgs. around VGWU-SAT2-AB01 and from 0 to 25 ft. bgs. around VGWU-SAT2-AB04, providing some vertical delineation of the elevated EC response and suggesting that produced water impacts may not extend to deeper soils.

3 SOIL ASSESSMENT

In November 2019, Arcadis conducted assessment activities to characterize the lateral and vertical extents of potential soil impacts at the Site. Soil boring locations were selected based on the results of confirmation soil sampling completed at the Site in October 2013 (**Figure 2**), locations of pipelines and other equipment at the Site, preliminary data collected from the EM survey, and the extent of the release

as documented by Chevron Mid-continent Business Unit (MCBU) personnel during the initial response activities. Information regarding the October 2013 assessment results can be viewed in **Appendix A**.

To evaluate the potential extent of impacts to soil at the Site, Arcadis advanced the following seven shallow soil borings using a stainless-steel hand auger on November 11, 2019 (**Figures 3** through **5)**.

- VGWU-SAT2-AB01 (0-1)
- VGWU-SAT2-AB02 (0-1)
- VGWU-SAT2-AB03 (0-1)
- VGWU-SAT2-AB04 (0-1)
- VGWU-SAT2-AB05 (0-1)
- VGWU-SAT2-AB06 (0-1)
- VGWU-SAT2-AB07 (0-1)

One soil sample was collected from each boring 1 ft. bgs. and placed in clean, laboratory-supplied sample containers, labeled, placed on ice, cooled to approximately 4 degrees Celsius and transported to Eurofins TestAmerica analytical laboratory under chain-of-custody protocol with a standard (10-day) turnaround time. Soil sampling methodology is explained further in **Appendix B**. Soil samples collected from each boring were analyzed for the following:

- Chloride by USEPA Method 300.

Following soil sample collection, the boreholes were filled with soil cuttings from total depth to ground surface. The ground surface was restored to match the surrounding conditions.

3.1 Soil Sample Results

Analytical data from the soil samples collected on November 20, 2019 were compared to the closure criteria (CC) outlined in Title 19, Chapter 15, Part 29 (19.15.29) of the New Mexico Administrative Code (NMAC) concerning natural resources and wildlife, oil and gas, and releases effective on August 14, 2018.

A summary of the analytical results collected from the seven soil borings are as follows:

- Chloride was detected in each of the seven soil samples with concentrations ranging from 10.1 milligram per kilogram (mg/kg) (VGWU-SAT2-AB03 (0-1)) to 5,630 mg/kg (VGWU-SAT2-AB01 (0-1)).

Soil samples collected during both the October 2013 and November 2019 assessment activities indicated chloride concentrations exceeded the 2018 revised CC of 600 mg/kg required for the top four ft. of surface material. However, soil samples collected deeper that 4 ft. bgs. during the October 2013 assessment (VGWU-SAT2-01) indicated chloride concentrations did not exceed the 2018 NMAC CC of 20,000 mg/kg for chloride soil concentrations where depth to water is greater than 100 feet bgs.

Depth to groundwater in this area is known to be greater than 100 ft. bgs. as seen on **Figure 9**, which shows recorded depth to groundwater measurements collected during 2018 from three sites located less than one mile south of the Site.

Analytical results for the seven soil samples are presented in **Table 1** and displayed on **Figures 3** through **5.** The complete laboratory analytical results with chain of custody documentation are included as **Appendix C**.

4 CONCLUSION

Analytical results from VGWU-SAT2-01 collected from two ft. bgs. reported chloride concentrations in soil exceeded the 2018 NMAC revised CC of 600 mg/kg (**Table 1)**. However, due to groundwater known to be greater than 100 ft. bgs. based on information obtained from the New Mexico Office of the State Engineer (NMOSE) online database (NMOSE 2020) (**Attachment 1**) and from previous drilling and monitoring well sampling events conducted by Arcadis within 1 mile of the Site (**Figure 9**), chloride concentrations detected below 4 ft. bgs. did not exceed the 2018 NMAC revised CC of 20,000 mg/kg. Analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH) were not detected above the laboratory reporting limits from any of the samples collected from VGWU-SAT2-01.

A geophysical survey was conducted on November 20th, 2019 to assess the lateral and vertical extent of possible produced water impacts to the soil. The findings of the geophysical survey indicated the following:

- The A-A' model, depicted on **Figure 6**, resolves two confined “perched” high conductivity zones in the northern portion of the profile that extend from approximately 0 to 15 ft. bgs. around VGWU-SAT2-AB02 and from 15 to 20 ft. bgs. around VGWU-SAT2-AB06, providing some vertical delineation of the elevated EC response and suggesting that produced water impacts may not extend to deeper soils,
- The B-B' model, portrayed on **Figure 7**, resolves a confined “perched” high conductivity zone in the northern portion of the profile that extend from approximately 0 to 30 ft. bgs. suggesting that produced water impacts may not extend to deeper soils,
- The C-C' model, shown on **Figure 8**, resolves two discontinuous confined “perched” high conductivity zones that extend from approximately 0 to 32 ft. bgs. around VGWU-SAT2-AB01 and from 0 to 25 ft. bgs. around VGWU-SAT2-AB04, providing some vertical delineation of the elevated EC response and suggesting that produced water impacts may not extend to deeper soils.

Chloride was detected in all seven soil samples collected on November 20, 2019 at a depth of 1 ft. bgs. Of these seven samples, only VGWU-SAT2-AB01 (0-1) and VGWU-SAT2-AB02 (0-1) showed chloride concentrations in soil exceeded the 2018 NMAC revised closure criteria of 600 mg/kg (**Table 1**) for soils located at surface to 4 ft. bgs.

5 CLOSING

Data presented in this Report support that affected soil associated with the release pose no significant threat to groundwater resources or other receptors. Although soil analysis indicated exceedances of the 2018 NMAC revised closure criteria of 600 mg/kg for chloride (**Table 1**), oilfield infrastructure, surface structures, aboveground and belowground pipelines, and utility corridors surround the spill area, therefore posing a health and safety risk that prevents additional assessment and/or remedial action in this area at this time. It is recommended that full remediation of the October 15, 2012 release location be deferred until operations at the facility cease and the associated structures and equipment are abandoned.

Potential migration of remaining chloride concentrations in soil to groundwater is not expected to have occurred nor is expected to occur due to the observed fine-grained, confining nature of caliche layers present beneath the Site. Results of the geophysical survey further suggest that produced water impacts may not extend to deeper soils. Additionally, the October 2013 soil analysis of sample VGWU-SAT2-01 show chloride does not exceed the NMAC CC or 20,000 mg/kg in soils deeper than 4 ft. bgs, and chloride concentrations decrease below 100 mg/kg (85 mg/kg) at 30 ft. bgs (well above the water table). Based on the data presented in this Report, and concurrence from the NMOCD, no further assessments or additional cleanup actions are required at the Site until after abandonment of the facility.

A deferral status is requested for the Site.

Arcadis U.S., Inc.

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TABLES

Table 1
2019 Soil Analytical Results - Inorganics
Chevron Environmental Management Company
Vacuum Glorieta West Unit Satellite 2
NW 1/4, SE 1/4, Section 25, Township 17 South, Range 37 East
Lea County, New Mexico

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Boring Location ID	Sample Date	Sample Depth	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total BTEX	TPH: GRO	TPH: DRO	Chloride	Moisture
		(ft. bgs.)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(mg/Kg)	(%)
NMAC Closure Criteria (a)			**10**				**50**	**1,000**	**1,000**	**10,000**	**--**
VGWUSAT2-01	10/30/2013	2	<0.022	<0.022	<0.022	<0.022	<0.088	<1.1	<8.9	1,200	7.1
VGWUSAT2-01	10/30/2013	5	<0.021	<0.021	<0.021	<0.021	<0.084	<1.1	<8.9	1,300	6.3
VGWUSAT2-01	10/30/2013	10	<0.024	<0.024	<0.024	<0.024	<0.096	<1.2	<10	960	18
VGWUSAT2-01	10/30/2013	15	<0.021	<0.021	<0.021	<0.021	<0.084	<1.1	<8.7	1,000	5
VGWUSAT2-01	10/30/2013	20	<0.028	<0.028	<0.028	<0.028	<0.112	<1.4	<11	1,000	27
VGWUSAT2-01	10/30/2013	25	<0.024	<0.024	<0.024	<0.024	<0.096	<1.2	<10	620	17
VGWUSAT2-01	10/30/2013	30	<0.021	<0.021	<0.021	<0.021	<0.084	<1.1	<8.8	85	6.2
VGWU-SAT2-AB01 (0-1)	11/20/2019	0 to 1	--	--	--	--	--	--	--	5,630	7
VGWU-SAT2-AB02 (0-1)	11/20/2019	0 to 1	--	--	--	--	--	--	--	2,330	5.6
VGWU-SAT2-AB03 (0-1)	11/20/2019	0 to 1	--	--	--	--	--	--	--	10.1	5.2
VGWU-SAT2-AB04 (0-1)	11/20/2019	0 to 1	--	--	--	--	--	--	--	155	7
VGWU-SAT2-AB05 (0-1)	11/20/2019	0 to 1	--	--	--	--	--	--	--	30.8	8.9
VGWU-SAT2-AB06 (0-1)	11/20/2019	0 to 1	--	--	--	--	--	--	--	359	11.7
VGWU-SAT2-AB07 (0-1)	11/20/2019	0 to 1	--	--	--	--	--	--	--	91.4	8.4

Notes:
1) **Bold**: Exceeds NMAC 50 - 100 feet below the bottom of the temporary pit
2) BTEX: benzene, toluene, ethylbenzene, and xylene
3) TPH: Total Petroleum Hydrocarbon
4) DRO-GRO: Diesel Range Organics - Gasoline Range Organics
5) < : Not detected above the method reporting limit
6) NMAC: New Mexico Administrative Code - closure criteria for pit closure:
7) -- : Not Analyzed
8) %: Percent.
9) mg/Kg: Milligram(s) Per Kilogram
10) ft: Feet
11) bgs: Below Ground Surface
12) (a) Title 19, Chapter 15 of the NMAC for Natural Resources and Wildlife, Oil and Gas, and Releases, 19.15.29 NMAC. August.

FIGURES

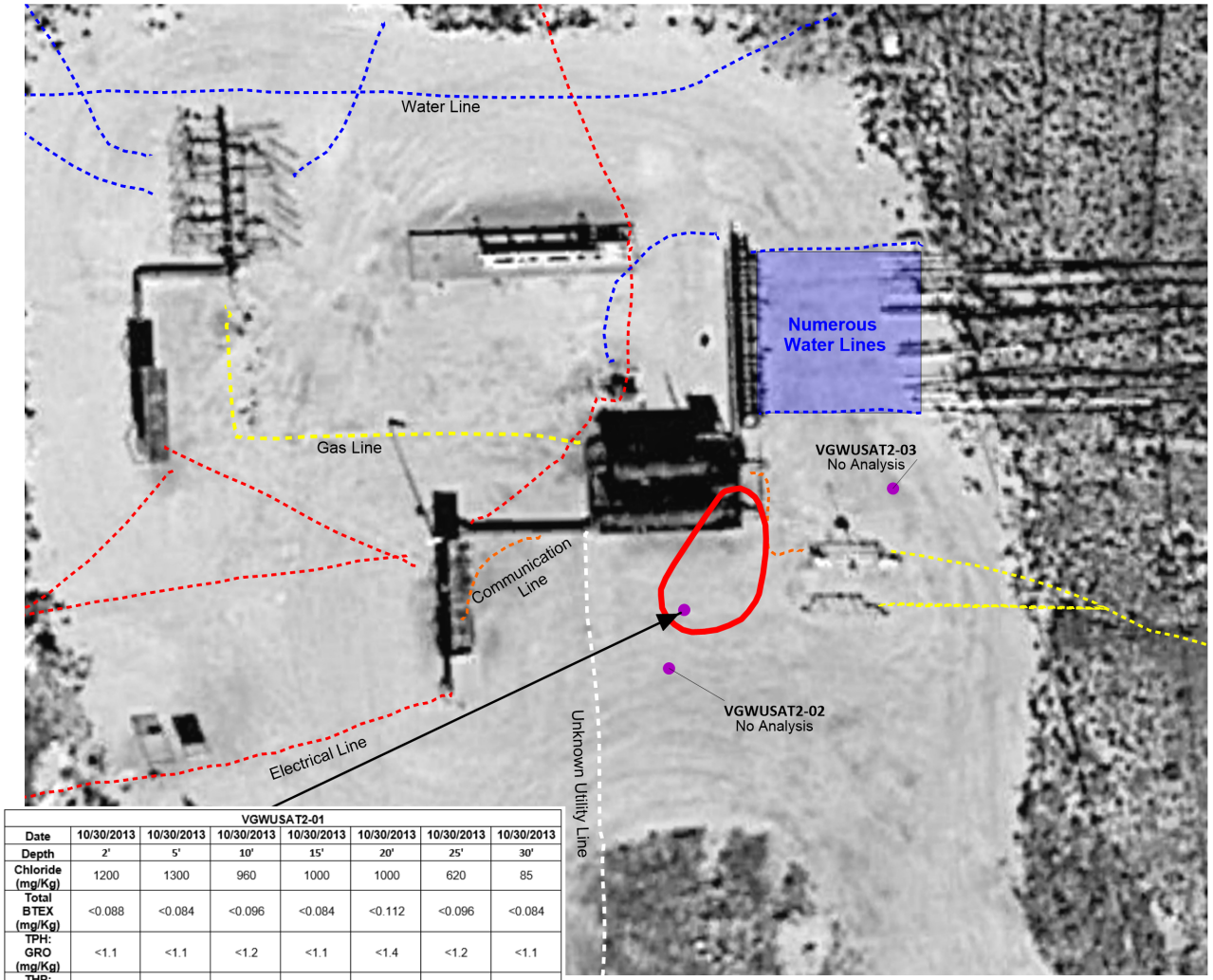
SITE MAP

ARCADIS Design & Consultancy for natural and built assets

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

NOTE: AERIAL PHOTOGRAPH FROM GOOGLE EARTH PRO.

FIGURE 1



VGWUSAT2-01							
Date	10/30/2013	10/30/2013	10/30/2013	10/30/2013	10/30/2013	10/30/2013	10/30/2013
Depth	2'	5'	10'	15'	20'	25'	30'
Chloride (mg/Kg)	1200	1300	960	1000	1000	620	85
Total BTEX (mg/Kg)	<0.088	<0.084	<0.096	<0.084	<0.112	<0.096	<0.084
TPH: GRO (mg/Kg)	<1.1	<1.1	<1.2	<1.1	<1.4	<1.2	<1.1
THP: DRO (mg/Kg)	<8.9	<8.9	<10	<8.7	<11	<10	<8.8

LEGEND

- APPROXIMATE EXTENT OF SPILL
- OCTOBER 2013 SHALLOW SOIL SAMPLE LOCATION
- COMMUNICATION LINES
- ELECTRICAL LINE
- WATER LINE
- GAS LINE
- UNKNOWN UTILITY LINE

SCALE IN FEET

0 20 40 60 80 100

NOTES: Aerial photograph from Google Esrth Pro.
< = Sample result detected below laboratory reporting limit
ft = feet
mg/Kg = milligrams per kilogram

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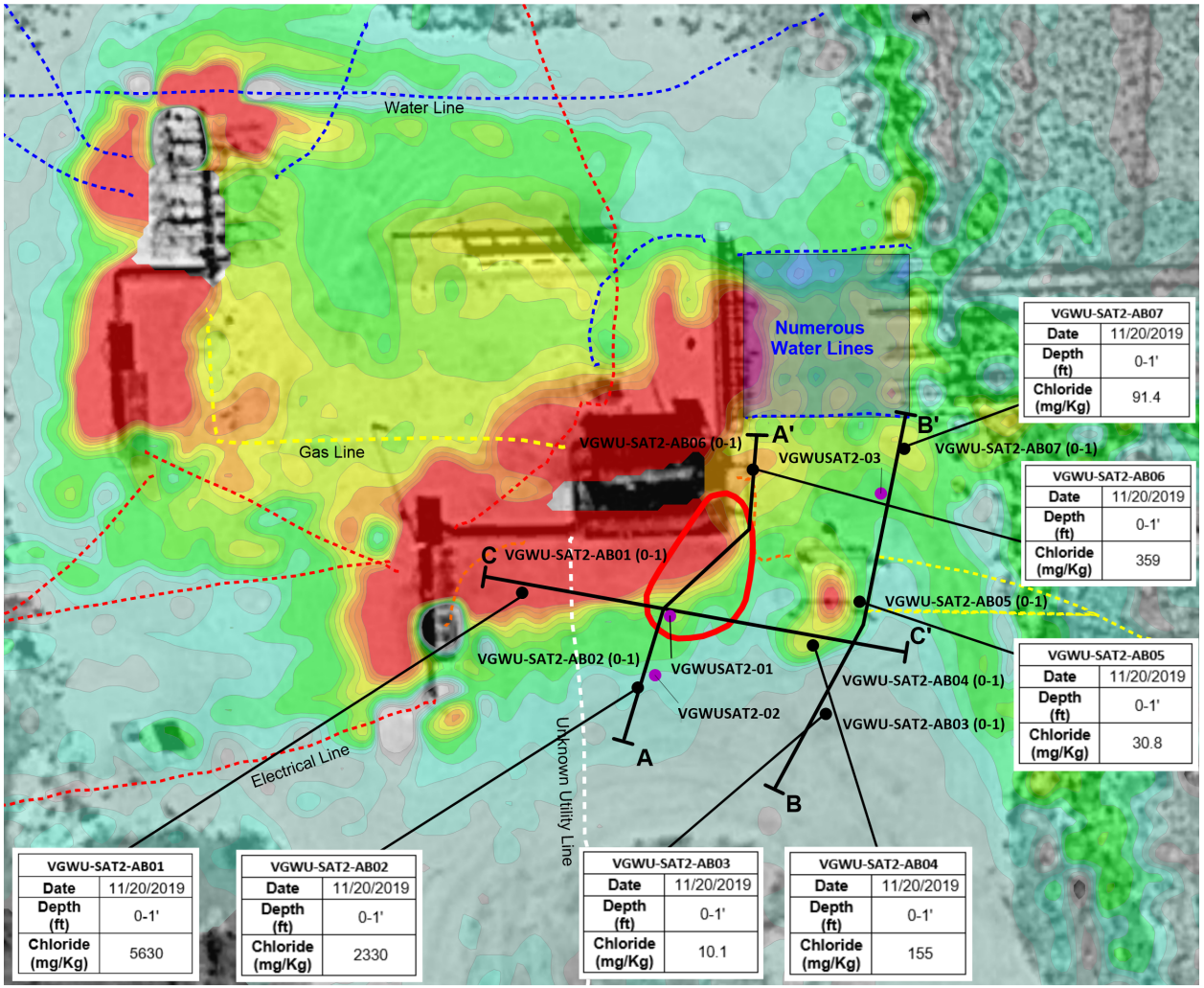
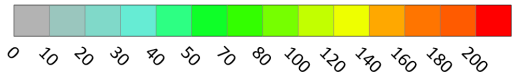
SITE MAP

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

FIGURE 2





ELECTRICAL CONDUCTIVITY
milliSiemens/meter

LEGEND

- APPROXIMATE EXTENT OF SPILL
- OCTOBER 2013 SHALLOW SOIL SAMPLE LOCATION
- NOVEMBER 2019 SHALLOW SOIL SAMPLE LOCATION
- COMMUNICATION LINES
- ELECTRICAL LINE
- WATER LINE
- GAS LINE
- UNKNOWN UTILITY LINE
- MODELLED GEM-2 PROFILE

NOTES: Aerial photograph from Google Earth Pro.
< = Sample result detected below laboratory reporting limit
ft = feet
mg/Kg = milligrams per kilogram

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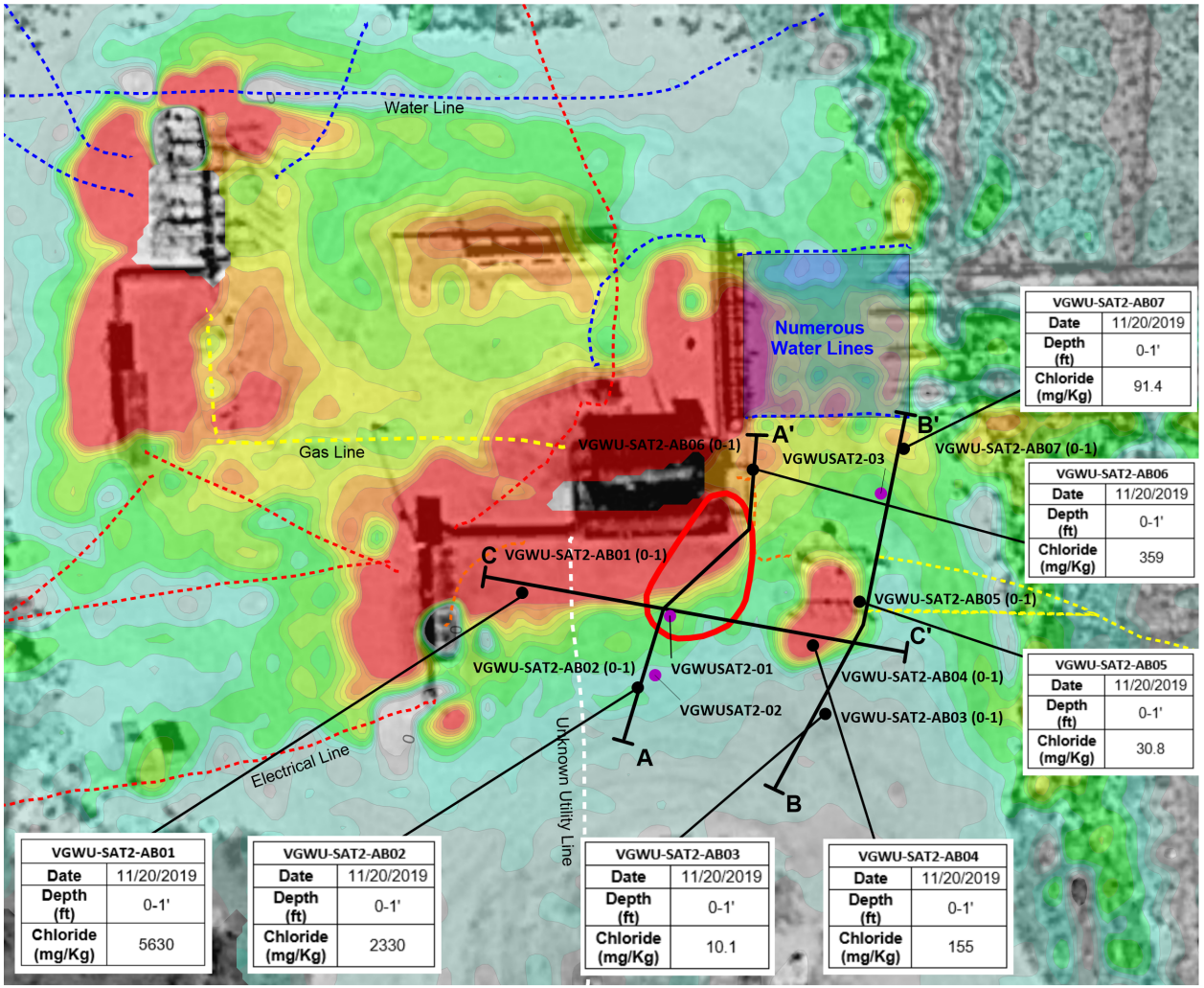
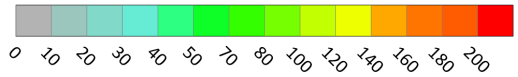
GEM-2 Electrical Conductivity Depth Map - 63 kHz Frequency
Approximate Penetration Depth of 4 to 8 feet bgs

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

FIGURE 3





ELECTRICAL CONDUCTIVITY
milliSiemens/meter

LEGEND

- APPROXIMATE EXTENT OF SPILL
- OCTOBER 2013 SHALLOW SOIL SAMPLE LOCATION
- NOVEMBER 2019 SHALLOW SOIL SAMPLE LOCATION
- COMMUNICATION LINES
- ELECTRICAL LINE
- WATER LINE
- GAS LINE
- UNKNOWN UTILITY LINE
- MODELLED GEM-2 PROFILE

NOTES: Aerial photograph from Google Earth Pro.
< = Sample result detected below laboratory reporting limit
ft = feet
mg/Kg = milligrams per kilogram

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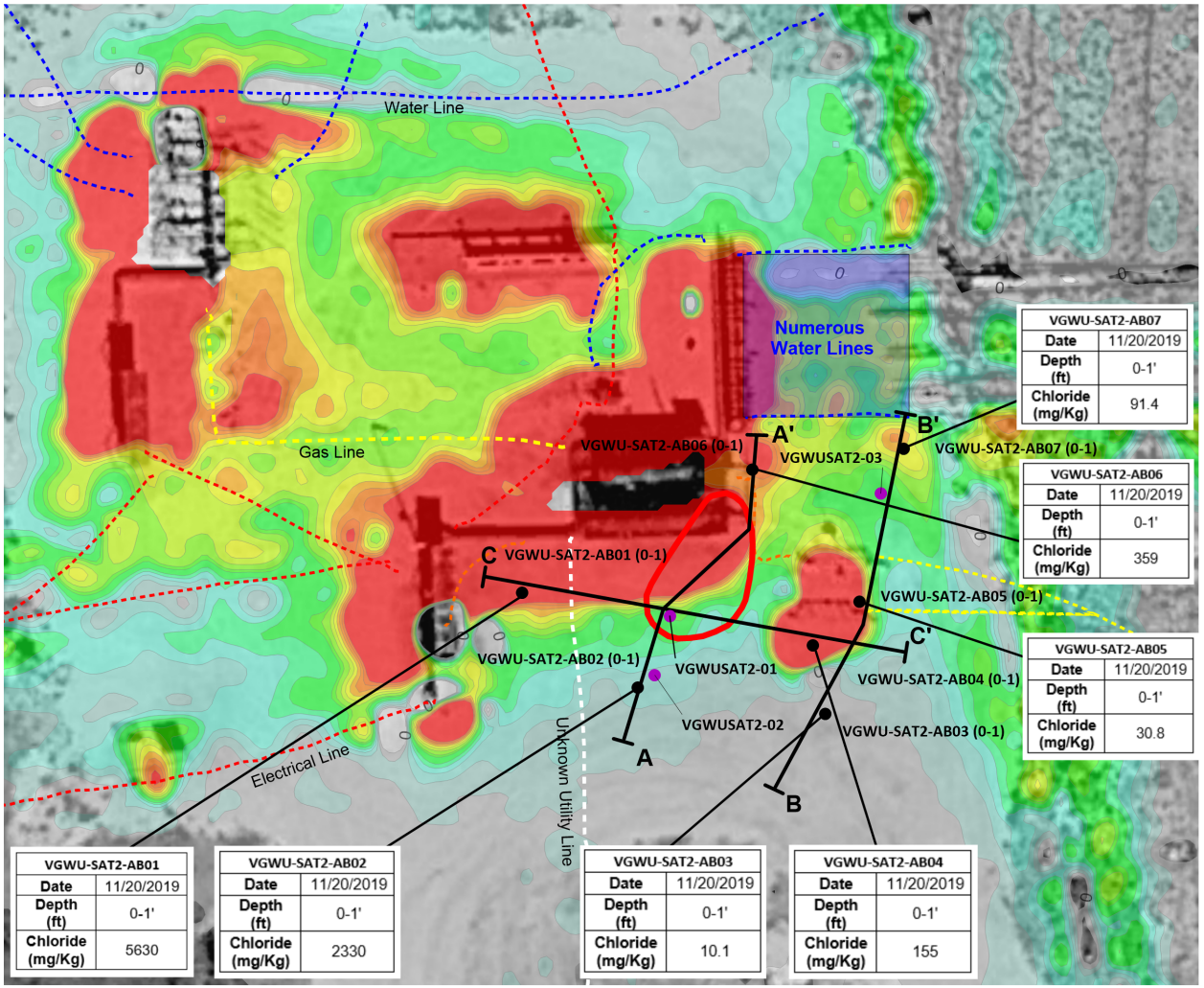
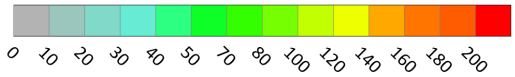
GEM-2 Electrical Conductivity Depth Map - 18.3 kHz Frequency
Approximate Penetration Depth of 6 to 10 feet bgs

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

FIGURE 4





ELECTRICAL CONDUCTIVITY
milliSiemens/meter

LEGEND

- APPROXIMATE EXTENT OF SPILL
- OCTOBER 2013 SHALLOW SOIL SAMPLE LOCATION
- NOVEMBER 2019 SHALLOW SOIL SAMPLE LOCATION
- COMMUNICATION LINES
- ELECTRICAL LINE
- WATER LINE
- GAS LINE
- UNKNOWN UTILITY LINE
- MODELLED GEM-2 PROFILE

SCALE IN FEET

0 20 40 60 80 100

NOTES: Aerial photograph from Google Earth Pro.
< = Sample result detected below laboratory reporting limit
ft = feet
mg/Kg = milligrams per kilogram

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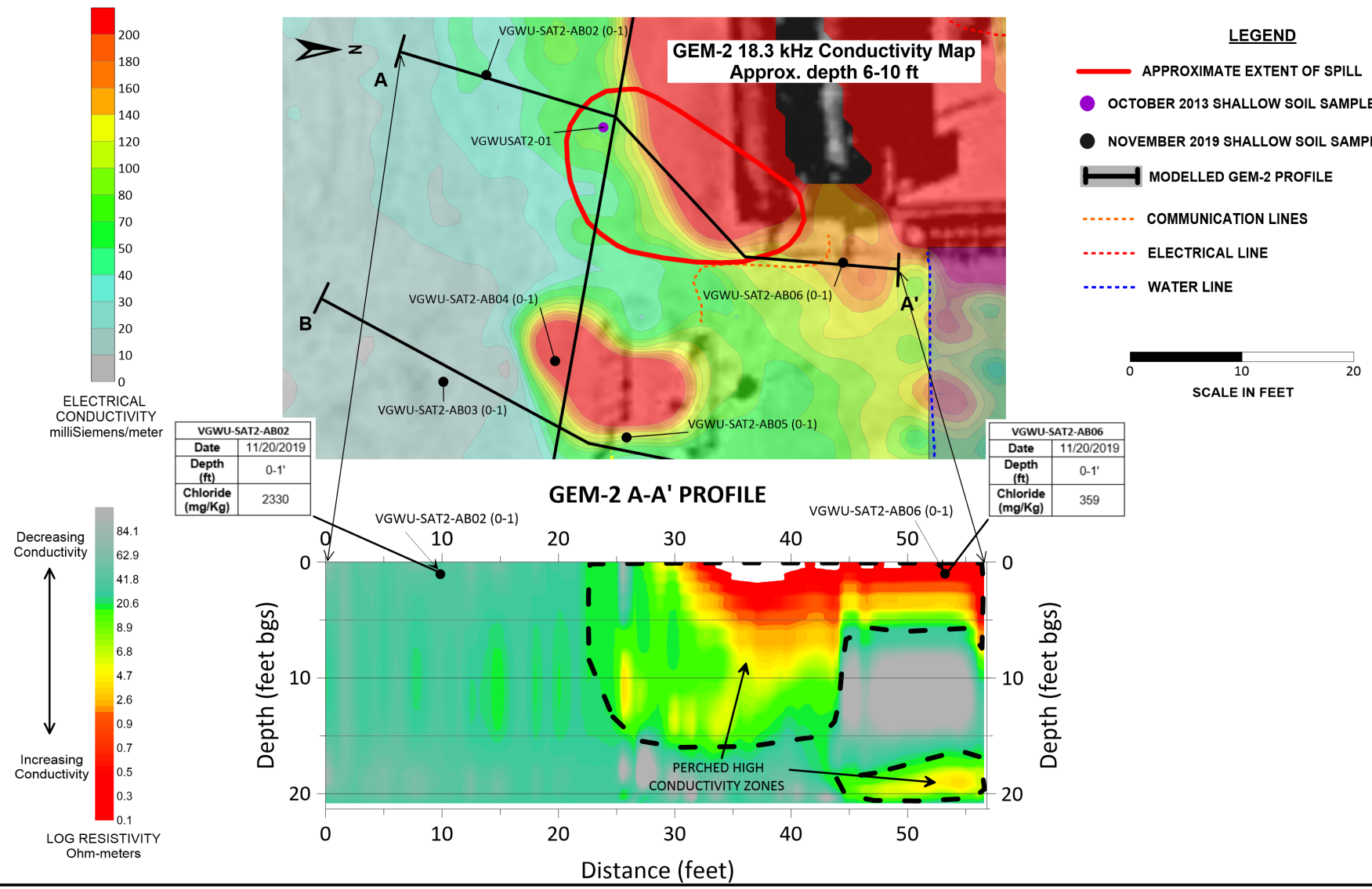
GEM-2 Electrical Conductivity Depth Map - 5.3 kHz Frequency
Approximate Penetration Depth of 8 to 12 feet bgs

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

FIGURE 5

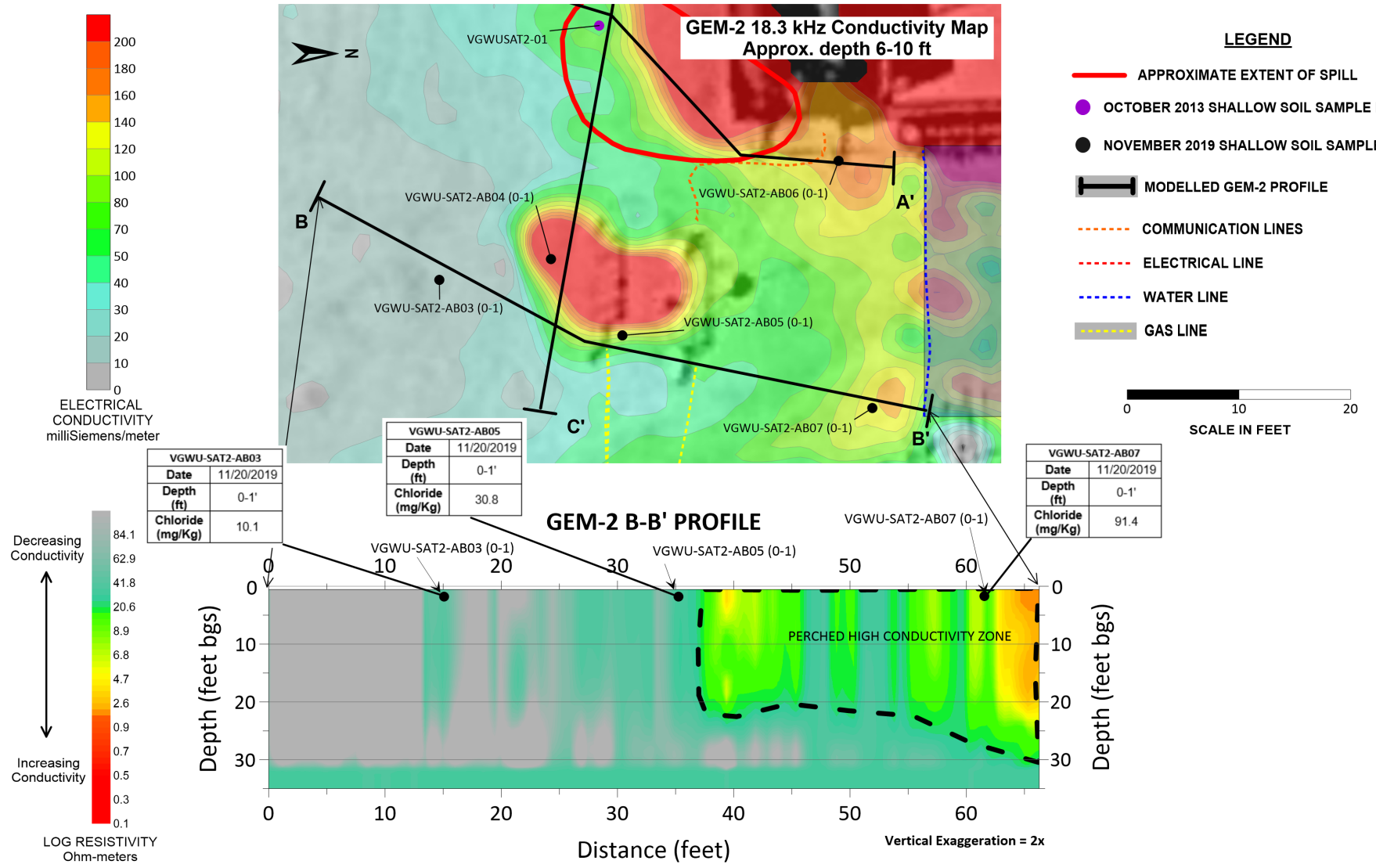


ARCADIS Design & Consultancy for natural and built assets

MODELLED GEM-2 PROFILE - SECTION A-A'

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

FIGURE 6

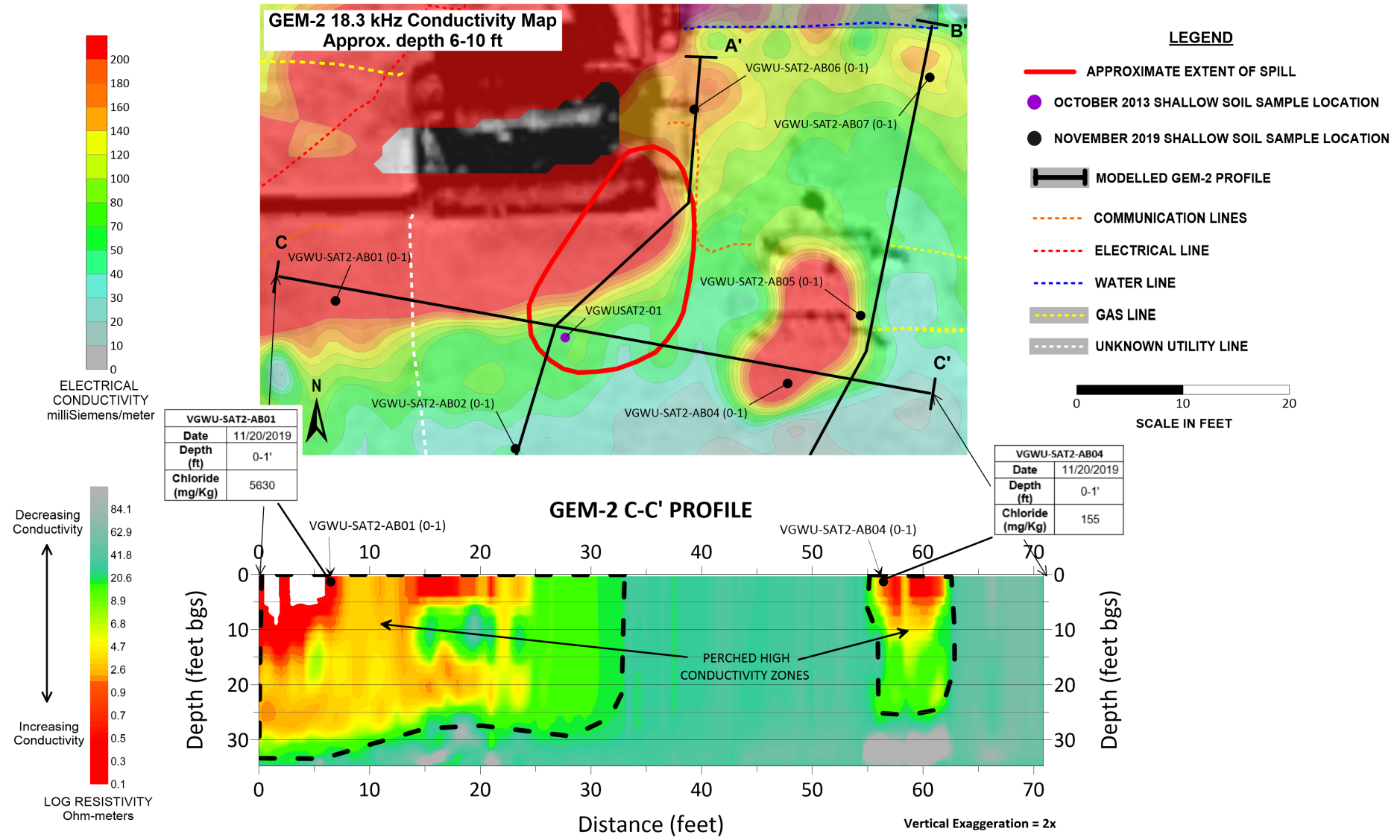


ARCADIS Design & Consultancy for natural and built assets

MODELLED GEM-2 PROFILE - SECTION B-B'

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

FIGURE 7

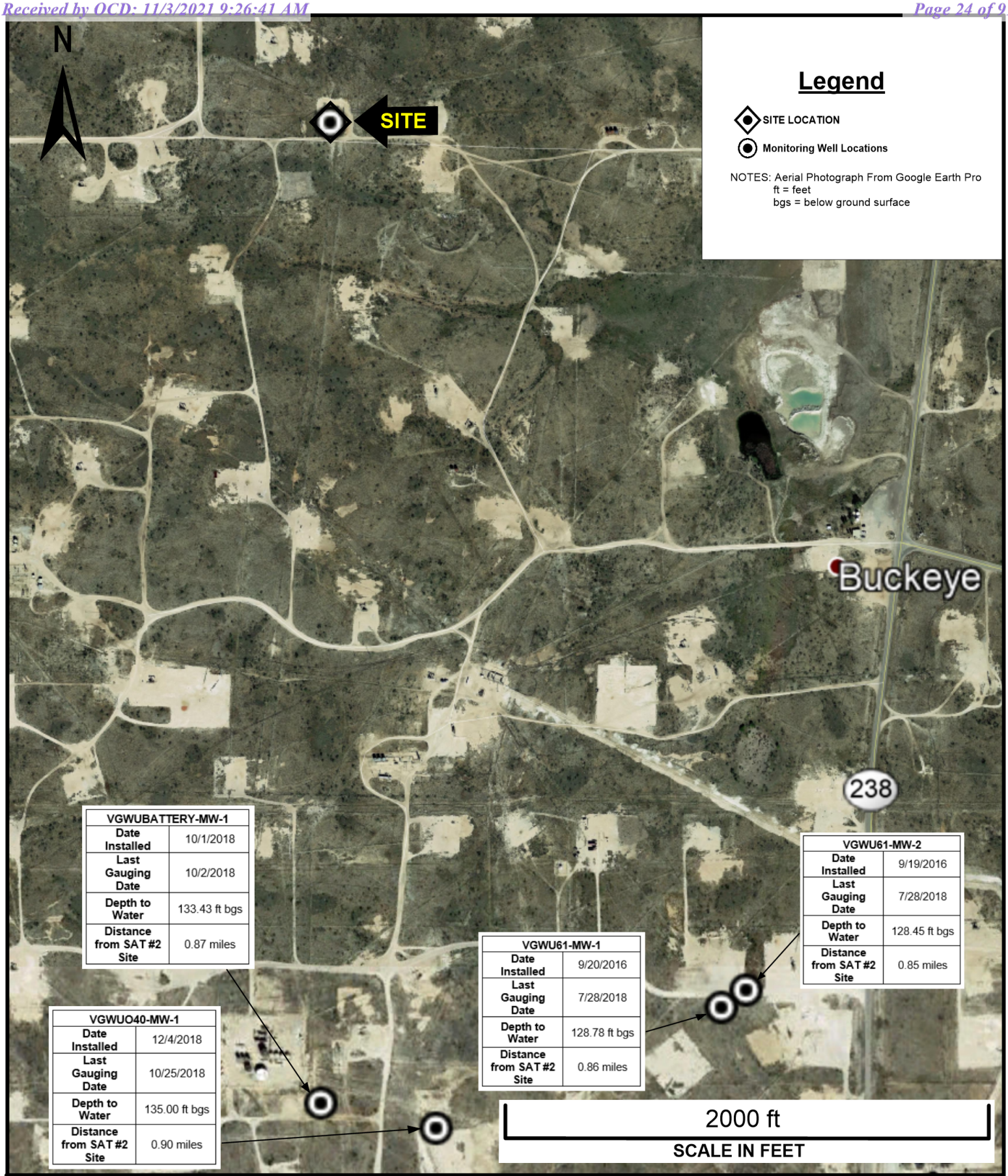


ARCADIS Design & Consultancy for natural and built assets

MODELLED GEM-2 PROFILE - SECTION C-C'

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

FIGURE 8



ARCADIS Design & Consultancy for natural and built assets

Monitoring Well Location Map

VGWU SAT #2
Vacuum/Lovington Functional Management Team Units
Lea County, New Mexico

NOTE: AERIAL PHOTOGRAPH FROM GOOGLE EARTH PRO.

FIGURE 9

ATTACHMENT 1

NMOSE Water Supply Wells

New Mexico Office of the State Engineer

Wells with Well Log Information

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(in feet)

POD Number	POD Code	Subbasin	County	Source	q 64	q 16	q 4	Sec	Twn	Rng	X	Y	Distance	Start Date	Finish Date	Log File Date	Depth Well	Depth Water	Driller	License Number
L 02217		L	LE	Shallow		2	4	25	17S	34E	639730	3630571*	682	05/25/1953	06/10/1953	06/15/1953	120	75	SHELTON, G.L.	136
L 05106		L	LE	Shallow		1	3	25	17S	34E	638524	3630547*	771	04/15/1963	04/15/1963	05/24/1963	150	95		46
L 05022		L	LE			3	4	24	17S	34E	639310	3631773*	820	12/14/1962	12/14/1962	12/19/1962	140	80		111
L 06357 S2		L	LE	Shallow	3	1	1	30	17S	35E	640017	3631285	903	06/20/1989	06/20/1989	07/25/1989	230	130	KATHY EADES	982
L 02308		L	LE	Shallow		4	4	25	17S	34E	639736	3630168*	975	08/07/1953	08/12/1953	10/07/1953	130	76	QUARLES, J.R.	144

Record Count: 5

UTMNAD83 Radius Search (in meters):

Easting (X): 639172.47 **Northing (Y):** 3630964.16 **Radius:** 1000

***UTM location was derived from PLSS - see Help**

ATTACHMENT 2

C-141 Forms

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

HOBBS OCD
AUG 20 2014
RECEIVED

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company CHEVRON U.S.A Inc.	Contact: Josie DeLeon
Address 56 Texas Camp Road, Lovington, NM 88260	Telephone No. Office: 575-396-4414 ext 275 Cellular: 505-787-9816
Facility Name Vacuum Glorietta West Satellite #2	Facility Type Prod Satellite (nearest well VGWU #18 API 3002531782)

Surface Owner State of New Mexico	Mineral Owner State of New Mexico	API No.

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
G	25	17.0S	34.0E					Lea

Latitude 32.807854 **Longitude** --103.513466

NATURE OF RELEASE

Type of Release Crude Oil and Produced Water Spill	Volume of Release 5bbls of pw & 0.5bbl of oil	Volume Recovered 0 bbls
Source of Release Water Injection Station Pump	Date and Hour of Occurrence 10/15/12 8:50 PM	Date and Hour of Discovery 10/15/12 10:20 PM
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Mr. Leking via voicemail	
By Whom? Josie DeLeon	Date and Hour 8/17/12 2:00PM	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

VGWU Sat 2 6" steel underground trunk line leaked due to internal/external corrosion.

Describe Area Affected and Cleanup Action Taken.*

Fluids saturated 10' circular area approx 6' deep around underground line on the satellite pad near the riser. On discovery field was shut in to repair trunk line. Since leak is at center of satellite, full remediation will take place on abandonment of facility.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION	
Printed Name: David Pagano	Approved by Environmental Specialist:	
Title: Health & Environmental Specialist	Approval Date: 8-20-14	Expiration Date: 10-22-14
E-mail Address: dpgn@chevron.com	Conditions of Approval: Sit Supervisor required Submit final C-141 by 10-22-14	Attached ☐ IRP-3263
Date: 10/23/12 Phone: 505-787-9816		

* Attach Additional Sheets If Necessary

ogrid 4323
API 1423 25 5378
P 701423 25 5505

AUG 2

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	nT11423255378
District RP	1RP-3263
Facility ID	30-025-31782
Application ID	pTO1423255505

Release Notification

Responsible Party

Responsible Party: Chevron USA	OGRID: 4243
Contact Name: Armando Martinez	Contact Telephone: 505-690-5408
Contact email: amarti@chevron.com	Incident # *(assigned by OCD)* nKJ1514727866
Contact mailing address:	

Location of Release Source

Latitude 32.807854 Longitude -103.513466

(NAD 83 in decimal degrees to 5 decimal places)

Site Name: VGWU Satellite 2	Site Type: Satellite
Date Release Discovered: 05/16/2015	API# *(if applicable):* N/A

Unit Letter	Section	Township	Range	County
G	25	17S	34E	Lea

Surface Owner: ☒ State ☐ Federal ☐ Tribal ☐ Private

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☒ Crude Oil	Volume Released (bbls): 0.5	Volume Recovered (bbls): 0
☒ Produced Water	Volume Released (bbls): 5	Volume Recovered (bbls): 0
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☒ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)
Cause of Release: VGWU Sat 2 6” steel underground trunk line leaked due to internal/external corrosion.		

State of New Mexico
Oil Conservation Division

Incident ID	nT11423255378
District RP	1RP-3263
Facility ID	30-025-31782
Application ID	pTO1423255505

Was this a major release as defined by 19.15.29.7(A) NMAC? ☐ Yes ☒ No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

Incident ID	nT11423255378
District RP	1RP-3263
Facility ID	30-025-31782
Application ID	pTO1423255505

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	131 (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☐ Yes ☒ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells. **Attached.**
Field data: **Attached.**
Data table of soil contaminant concentration data: **Attached.**
Depth to water determination: **Greater than 100 ft bgs.**
Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release: **None identified.**
Boring or excavation logs: **Boring logs not completed.**
Photographs including date and GIS information: **Photograph log attached.**
Topographic/Aerial maps; **Aerial map attached.**
Laboratory data including chain of custody: **Attached.**

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	nT11423255378
District RP	1RP-3263
Facility ID	30-025-31782
Application ID	pTO1423255505

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Armando Martinez Title: Operation Lead – Central

Signature:_____ _ _____ Date: _10/20/2021_____

email: ____ amarti@chevron.com _____ Telephone: 505-690-5408_____

OCD Only

Received by: _____ Date: _____

Form C-141
Page 5

State of New Mexico
Oil Conservation Division

Incident ID	nT11423255378
District RP	1RP-3263
Facility ID	30-025-31782
Application ID	pTO1423255505

Remediation Plan

Remediation Plan Checklist: ***Each of the following items must be included in the plan.***

- ☐ Detailed description of proposed remediation technique
- ☐ Scaled sitemap with GPS coordinates showing delineation points
- ☐ Estimated volume of material to be remediated
- ☐ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- ☐ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: ***Each of the following items must be confirmed as part of any request for deferral of remediation.***

☒ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.

☒ Extents of contamination must be fully delineated. **Lateral delineation was achieved.**

☒ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Armando Martinez _____ Title: _____Operation Lead Central

Signature:_____ _____ Date: _10/20/2021_____

email: amarti@chevron.com _____ Telephone: ____505-690-5408_____

OCD Only

Received by: _____ Date: _____

☐ Approved ☐ Approved with Attached Conditions of Approval ☐ Denied ☒ Deferral Approved

Signature: Bradford Billings Date: 11/02/2022

State of New Mexico
Oil Conservation Division

Incident ID	nT11423255378
District RP	1RP-3263
Facility ID	30-025-31782
Application ID	pTO1423255505

ATTACHMENT 3

2013 Soil Boring Logs

BORING LOG

Well No.: VGWUSAT2-D1 Date Drilled: 10/30/13

Client Name: VACUUM GLORIETA WEST UNIT SATELLITE 2

Site Location: CHEVRON FMT

Project No.: B004816 Drilling Method: AIR ROTARY

Logged By: MPHAN Sample Method: SHOVEL

Drilling Co.: HCI Driller: KCOOPER

Sample / Core Interval			P. I. D. (PPM)				Description Depth (ft)		Description
Device	Depth (ft)	Recovery (ft)	Depth (ft)	Reading	Sample Analysis	U. S. C. S.	from	to	(Lithology, Munsell Color, Grain Size w/percentages (most to least), Roundness, Sorting, Consistency/Hardness, Moisture Content, Bedding, Fractures, Additional Remarks)
AR				68.1			0	2	Nodular Caliche; 7.5YR 7/4 (Pink) to 7/1 (light gray); dry; medium; subrounded to subangular nodules (some), 5mm to 30mm; well sorted
AR				126			2	5	SAA; 7.5YR 7/2 (Pinkish gray)
AR				20.4			5	10	Soft Caliche; 7.5YR 8/3 (Pink) to 8/2 (Pinkish white); trace rounded nodules, 1mm to 3mm; poorly sorted; dry; soft; cohesive
AR				38.4			10	15	SAA; 7.5YR 8/2 (Pinkish white); trace subrounded nodules; chalky
AR				61.2			15	20	SAA
AR				42.3			20	25	Sandy Caliche; 7.5YR 7/3 (Pink) to 7/2 (Pinkish gray); fine grained; soft; dry;
AR				18.3			25	30	Sandstone; 7.5YR ~~7/3 (Pink)~~ 6/3 (light brown); fine to very fine grained; soft; moist; homogeneous in color

BORING LOG

Well No.: VGWUSAT2-02 Date Drilled: 10/30/13
Client Name: CHEVRON EMT
Site Location: VACUUM GLORIETTA WEST UNIT SATELLITE 2
Project No.: 800486 Drilling Method: AIR ROTARY
Logged By: MPHAN Sample Method: SHOVEL
Drilling Co.: HCI Driller: KCOOPER

Sample / Core Interval			P. I. D. (PPM)				Description Depth (ft)		Description
Device	Depth (ft)	Recovery (ft)	Depth (ft)	Reading	Sample Analysis	U. S. C. S.	from	to	(Lithology, Munsell Color, Grain Size w/percentages (most to least), Roundness, Sorting, Consistency/Hardness, Moisture Content, Bedding, Fractures, Additional Remarks)
AR				5.3			0	2	Nodular Caliche; 7.5YR 8/2 (Pinkish white); trace subangular to subrounded nodules, 3mm to 8mm, poorly sorted; dry; medium to hard; cohesive
AR				2.3			2	5	SAA; 7.5YR 7/3 (Pink) to 8/2 (Pinkish white); little subangular to subrounded nodules, 1mm to 42mm; well sorted
AR				11.1			5	10	Soft Caliche; 7.5YR 8/2 (Pinkish white); trace subrounded nodules, 3mm to 11mm; poorly sorted; soft; dry; ~~cl~~ cohesive
AR				8.2			10	15	SAA; 7.5YR 8/2 (Pinkish white) to 8/3 (Pink); chalky
AR				5.6			15	20	SAA; 7.5YR 8/2 (Pinkish white)
AR				3.7			20	25	Sandy Caliche; 7.5YR 7/2 (Pinkish gray) to 10YR 8/2 (very Pale brown); fine to medium grained; soft; dry
AR				9.3			25	30	Sandstone; 10YR 6/3 (Pale brown); fine grained; soft; dry to moist

BORING LOG

Well No.: VGWMSAT2-DB Date Drilled: 10/30/13
Client Name: CHEVRON EMT
Site Location: VACUUM GLORIETA WEST UNIT SATELLITE 2
Project No.: B004816 Drilling Method: AIR ROTARY
Logged By: MPHAN Sample Method: SHOVEL
Drilling Co.: HCI Driller: K COOPER

Sample / Core Interval			P. I. D. (PPM)				Description Depth (ft)		Description
Device	Depth (ft)	Recovery (ft)	Depth (ft)	Reading	Sample Analysis	U. S. C. S.	from	to	(Lithology, Munsell Color, Grain Size w/percentages (most to least), Roundness, Sorting, Consistency/Hardness, Moisture Content, Bedding, Fractures, Additional Remarks)
AR				6.4			0	2	Birdseye (Caprock) Caliche; 7.5YR 4/2 (brown) to 8/4 (pink); hard; moist to dry; subangular (some), 2mm to 28 mm; poorly sorted
AR				3.5			2	5	SAA; 7.5 YR 4/2 (Brown) to 8/3 (pink); 2mm to 13 mm
AR				5.1			5	10	Brecciated Caliche; 7.5YR 5/3 (Brown), 5/1 (gray), 8/2 (pinkish white); subangular to subrounded; fractured; 1mm to 3mm, poorly sorted; hard; dry
AR				6.6			10	15	Nodular Caliche; 7.5YR 8/3 (pink) to 8/2 (Pinkish white); little subrounded ~~nodular~~ nodules, poorly sorted, 1mm to 3mm; dry; medium; chalky
AR				4.6			15	20	SAA; trace rounded to subrounded nodules, 2mm to 7mm;
AR				4.4			20	25	Soft Caliche; 7.5 YR 8/2 (Pinkish white); homogeneous in color; chalky; soft; cohesive
AR				5.5			25	30	SAA; 7.5YR 8/3 (Pink)

APPENDIX A

Site Background

ARCADIS Design & Consultancy for natural and built assets

REGULATORY BACKGROUND

According to the submitted New Mexico Oil and Conservation Division (NMOCD) Notification of Release and Correction Action Form (C-141) (**Attachment 2**), a release of approximately 5 barrels (bbls) of produced water and 0.5 bbls of oil occurred on October 15, 2012. Fluids saturated a 10-foot circular area approximately 6 feet (ft) below ground surface (bgs) around an underground line on the VGWU Satellite 2 pad. Chevron personnel stopped the release and conducted initial response activities, including the repair of the trunk line. Since the leak occurred at the center of VGWU Sat 2 pad, Chevron personnel could not excavate all visually impacted soil due to underground and aboveground infrastructure.

On October 30, 2013, Arcadis collected soil samples from three soil boring locations (VGWUSAT2-01, VGWUSAT2-02 and VGWUSAT2-3) advanced to a total depth of 30 ft. bgs. The locations of the soil borings were selected based on locations of pipelines, equipment, and structures at the Site, and on the extent of the release as documented by Chevron MCBU personnel during the initial response activities as depicted on **Figure 2.** Soil samples were collected in clean, laboratory-supplied sample containers, labeled, placed on ice, cooled to approximately 4 degrees Celsius, and transported to a State of New Mexico-certified laboratory (Eurofins TestAmerica in Houston, Texas), under chain-of-custody protocol and analyzed for the following compounds:

- Benzene, toluene, ethylene, and xylenes (collectively referred to as BTEX) in accordance with United States Environmental Protection Agency (USEPA) Method 8021B,
- Chloride in accordance with Standard Method 9056,
- Total petroleum hydrocarbons (TPH) gasoline range organics (GRO) and diesel range organics (DRO) in accordance with USEPA Method 8015B.

Soil samples were field screened for the presence of volatile organic compounds (VOC) using a photo ionization detector (PID). Soil samples were analyzed contingent on VOC concentrations observed during field the screening process. Only VGWUSAT2-01 samples were analyzed due to elevated VOC readings collected during the drilling event. Soil samples collected from VGWUSAT2-02 and VGWUSAT2-03 were placed on hold and later disposed of according to state and federal regulations by the lab. The complete laboratory analytical results with chain of custody documentation are included in **Appendix C**. Laboratory analytical results are summarized in **Table 1** and displayed on **Figure 2**. The analytical data indicated:

- BTEX compounds were not detected above their respective laboratory reporting limits,
- TPH-GRO was not detected above respective laboratory reporting limit,
- TPH-DRO was not detected above respective laboratory reporting limit,
- Chloride was detected in each of the seven samples collected at concentrations ranging from 85 milligrams per kilogram (mg/kg) at 30 ft. bgs. to 1,300 mg/kg at 5ft. bgs.

REGULATORY FRAMEWORK

The OCD has regulatory jurisdiction over corrective actions conducted at the Site. The OCD, in accordance with the NMOCD risk-based soil remediation action levels (SRALs) for benzene, total BTEX, and total petroleum hydrocarbons (TPH) for leaks, spills, and releases (NMOCD 1993) and the New Mexico Administrative Code (NMAC) revised closure criteria (CC) outlined in Title 19, Chapter 15, Part 29 (19.15.29) of the NMAC concerning natural resources and wildlife, oil and gas, and releases for soil beneath below grade tanks, drying pads associated with closed-loop systems, and pits, require the remediation of soil

exhibiting COCs above the calculated SRALs and the NMAC revised CC. The calculated SRALs and NMAC CC are detailed in the following table:

Analyte	SRALs and NMAC Closure Criteria (mg/kg)
Chloride	10,000
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	10
Total BTEX	50
Total Petroleum Hydrocarbons (TPH)	1,000

Note: mg/kg = milligrams per kilogram

Although analysis of confirmation soil samples collected in October 2013 and November 2019 from the Site resulted in exceedance of the 2018 NMAC revised closure criteria requiring the top four ft. of surface material containing chloride concentrations greater than 600 mg/kg to be remediated, oilfield infrastructure, surface structures, aboveground and belowground pipelines, and utility corridors surround the Site. The presence of these structures poses a health and safety risk and prevents additional drilling and other subsurface work in this area. Delineation activities beyond the pipelines and oilfield equipment surrounding the release would not be representative of release area.

GEOLOGY/HYDROGEOLOGY ASSESSMENT

Site Setting and Climate

The Site is located within the Chevron USA, Inc. (Chevron) operated VGWU approximately 13.4 miles southwest of Lovington, New Mexico. New Mexico Highway 238 is located approximately 0.55 mile east of the Site.

The Site is located in the NW 1/4 of the SE 1/4 of Section 25, Township 17 South, Range 34 east of Lea County, New Mexico. Latitude and longitude coordinates for the Site are 32° 48’ 28.27” N and 103° 30’ 48.48” W.

The Site is in the western edge of the Permian Basin, a 75,000-square-mile area in west Texas and New Mexico that is populated by numerous oil and gas production wells. In New Mexico, the Permian Basin extends to Roosevelt County to the north and Chaves County to the west. Lovington (the closest town) is approximately 14.5 miles northeast of the Site and the closest agricultural area is 8 miles northeast of the Site.

Monthly average temperatures near the Site vary from a minimum of 27.9 degrees Fahrenheit (°F) in January to a maximum of 93.9°F in July (Western Regional Climate Center [WRCC] Hobbs, New Mexico [294026] weather station). Total average precipitation recorded for the area of the Site from the available WRCC period of record between 1912 and 2016 was approximately 15.75 inches per year (WRCC 2019a).

Due to the arid climate, the Site experiences low precipitation and high evapotranspiration rates. The total average evapotranspiration from the available WRCC period of record between 1914 and 2005 was approximately 87.68 inches per year (WRCC 2019b).

Regional Geology and Hydrogeology

The Site is located on the Llano Estacado of the Western High Plains, an ecoregion of the Great Plains of North America. The Site is positioned immediately east of the Mescalero Ridge, which demarcates the western boundary of the (Miocene to Pliocene) High Plains Ogallala Formation (Reeves 1972). A rapid drop in elevation of 200 feet (ft.) to 250 ft. occurs west of the northwest-trending Mescalero Ridge. The Ogallala formation is unconfined and is predominantly composed of unconsolidated alluvial fan deposits of sand and gravel near the base, overlain by interbedded sand and clay in the upper portion of the formation (Seni 1980). Repeated depositional events on the High Plains surface beginning approximately 7 million years ago, followed by aerial exposure, generated a thick sequence of caliche horizons that are competent enough to act as a cliff for the expression of Mescalero Ridge. These hard caliche deposits form the upper portion of the stratigraphic sequence. In the Site area, the Ogallala Formation is underlain by red beds of the Upper Triassic-age Dockum Group consisting of claystones, sandstones, and siltstones. Aquifers within the Dockum Group are not considered a major water resource in the area of the Site due to poor water production rates and elevated levels of natural dissolved solids.

The main source of fresh groundwater in the area of the Site comes from the Ogallala aquifer. The Ogallala aquifer has a thickness of approximately 120 ft. in the vicinity of the Site and is considered the primary source of fresh water in the area. Depth to the groundwater regionally ranges from approximately 120 ft. to 135 ft. bgs.

Water-supply wells located on the southern High Plains east of Mescalero Ridge in central Lea County and near the Site are completed in the High Plains Aquifer (HPA). The HPA consists primarily of the High Plains Ogallala Formation, and in localized areas, alluvial sediment of Quaternary age. Near the Site, the HPA is present directly above the Triassic-age Dockum Group, which occurs at a depth of approximately 140 ft. bgs (Ash 1963, Fahlquist 2003, Nativ 1988, Nicholson and Clebsch 1961, Tillery 2008). The regional groundwater flow direction is to the east-southeast (Tillery 2008).

Based on satellite imagery, no surface-water bodies were identified within a radius of approximately 1-mile of the Site (GoogleEarth 2017). During April 2020, Arcadis reviewed information obtained from the New Mexico Office of the State Engineer (NMOSE) online database (NMOSE 2020). Results of the database inquiry indicated that five water-supply wells were completed in the Ogallala Aquifer located within a radius of 1,000 meters of the Site. However, two of the five water wells, POD Number L 05022 and POD L 05106 were plugged in 1963 and 1964 respectively. In addition, results of the database review indicate average depth to groundwater is 91.2 ft. bgs. Results of the database review are included in **Attachment 1**.

Site Geology

Lithologic data collected from installing soil borings VGWUSAT2-01, VGWUSAT2-02 and VGWUSAT2- 03 indicate that the subsurface material primarily consists of caliche (soil carbonate) profiles including “caprock,” nodular, and sandy caliche layers from surface to approximately 25 ft. bgs. transitioning to a soft calcareous sandstone from 25 ft. bgs. to 30 ft. bgs. Boring logs from the 2013 investigative assessment can be viewed on **Attachment 3**.

The subsurface stratigraphy based off the boring log provided in **Appendix E**, included the following:

- A caliche profile containing caprock, nodular and sand caliche, typically from surface to 25 feet below the ground surface (ft bgs),
- A friable, weakly cemented, fine grained calcareous sandstone, typically encountered at the base of the caliche profile from 25 to 30 ft bgs.

APPENDIX B

Field Methodology and Documentation

FIELD METHODOLOGY

Soil samples collected utilizing Grab methodology for soil samples collected during the October 30, 2013 drilling event and the November 2019 soil sampling event utilizing a stainless-steel hand auger. Soil samples were placed in clean, laboratory-supplied sample containers, labeled, placed on ice, cooled to approximately 4 degrees Celsius and transported to Eurofins TestAmerica analytical laboratory under chain-of-custody protocol with a standard (10-day) turnaround time.

Soil samples collected during the October 2013 drilling event were analyzed for the following:

- Benzene, toluene, ethylene, and xylenes (collectively referred to as BTEX) in accordance with United States Environmental Protection Agency (USEPA) Method 8021B, and
- Chloride by USEPA Method 300.

Soil samples collected during the November 2019 soil sampling event utilizing a stainless-steel hand auger were analyzed for the following:

- Chloride by USEPA Method 300.

Following soil sample collection, the boreholes were filled with soil cuttings from total depth to ground surface. The ground surface was restored to match the surrounding conditions.

APPENDIX C

Analytical Reports

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Houston
6310 Rothway Street
Houston, TX 77040
Tel: (713)690-4444

TestAmerica Job ID: 600-82102-1
Client Project/Site: HES Transfer Sites, Lea County NM

For:
ARCADIS U.S., Inc.
2929 Briarpark Drive
Suite 300
Houston, Texas 77042

Attn: Mr. Jonathan Olsen

SKudchadkar

Authorized for release by:
11/20/2013 6:00:17 PM

Sachin Kudchadkar, Senior Project Manager
(713)690-4444
sachin.kudchadkar@testamericainc.com

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Table of Contents

Case Narrative

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 600-82102-1
Project/Site: HES Transfer Sites, Lea County NM

Job ID: 600-82102-1

Laboratory: TestAmerica Houston

Narrative

Job Narrative
600-82102-1

Comments
No additional comments.

Receipt
The samples were received on 11/4/2013 2:42 PM; the samples arrived in good condition, properly preserved and, where required, on ice.
The temperatures of the 3 coolers at receipt time were 4.1º C, 4.4º C and 4.8º C.

GC/MS VOA
No analytical or quality issues were noted.

GC VOA
No analytical or quality issues were noted.

GC Semi VOA
Method(s) 8015B: Surrogate recovery for the following sample(s) was outside the upper control limit: (600-82031-1 MSD).

No other analytical or quality issues were noted.

General Chemistry
Method(s) 9056: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for batch 120730 were outside control limits for Chloride.
The associated laboratory control sample (LCS) recovery met acceptance criteria.

No other analytical or quality issues were noted.

Industrial Hygiene
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

Method Summary

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Method	Method Description	Protocol	Laboratory
8015B	Gasoline Range Organics - (GC)	SW846	TAL HOU
8021B	Volatile Organic Compounds (GC)	SW846	TAL HOU
8015B	Diesel Range Organics (DRO) (GC)	SW846	TAL HOU
9056	Anions, Ion Chromatography	SW846	TAL HOU
Moisture	Percent Moisture	EPA	TAL HOU

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL HOU = TestAmerica Houston, 6310 Rothway Street, Houston, TX 77040, TEL (713)690-4444

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
600-82102-1	VGWUSAT2-01-02	Solid	10/30/13 10:00	11/04/13 14:42
600-82102-2	VGWUSAT2-01-05	Solid	10/30/13 10:01	11/04/13 14:42
600-82102-3	VGWUSAT2-01-10	Solid	10/30/13 10:03	11/04/13 14:42
600-82102-4	VGWUSAT2-01-15	Solid	10/30/13 10:05	11/04/13 14:42
600-82102-5	VGWUSAT2-01-20	Solid	10/30/13 10:06	11/04/13 14:42
600-82102-6	VGWUSAT2-01-25	Solid	10/30/13 10:08	11/04/13 14:42
600-82102-19	VGWUSAT2-01-30	Solid	10/30/13 10:10	11/04/13 14:42

Client Sample Results

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 600-82102-1
Project/Site: HES Transfer Sites, Lea County NM

Client Sample ID: VGWUSAT2-01-02 Lab Sample ID: 600-82102-1

Date Collected: 10/30/13 10:00 Matrix: Solid
Date Received: 11/04/13 14:42 Percent Solids: 92.9

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.1		mg/Kg	☼	11/06/13 09:18	11/06/13 14:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*108*		*50 - 150*	*11/06/13 09:18*	*11/06/13 14:54*	*1*
4-Bromofluorobenzene	*104*		*50 - 150*	*11/06/13 09:18*	*11/06/13 14:54*	*1*

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.022		mg/Kg	☼	11/06/13 10:13	11/13/13 18:12	1
Toluene	ND		0.022		mg/Kg	☼	11/06/13 10:13	11/13/13 18:12	1
Ethylbenzene	ND		0.022		mg/Kg	☼	11/06/13 10:13	11/13/13 18:12	1
Xylenes, Total	ND		0.022		mg/Kg	☼	11/06/13 10:13	11/13/13 18:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*127*		*43 - 141*	*11/06/13 10:13*	*11/13/13 18:12*	*1*
a,a,a-Trifluorotoluene	*110*		*44 - 134*	*11/06/13 10:13*	*11/13/13 18:12*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		8.9		mg/Kg	☼	11/05/13 14:52	11/07/13 20:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*134*		*60 - 140*	*11/05/13 14:52*	*11/07/13 20:17*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**7.1**		1.0		%			11/05/13 15:31	1
Percent Solids	**93**		1.0		%			11/05/13 15:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1200**		43		mg/Kg	☼		11/18/13 12:17	10

Client Sample ID: VGWUSAT2-01-05 Lab Sample ID: 600-82102-2

Date Collected: 10/30/13 10:01 Matrix: Solid
Date Received: 11/04/13 14:42 Percent Solids: 93.7

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.1		mg/Kg	☼	11/06/13 09:18	11/06/13 15:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*106*		*50 - 150*	*11/06/13 09:18*	*11/06/13 15:19*	*1*
4-Bromofluorobenzene	*100*		*50 - 150*	*11/06/13 09:18*	*11/06/13 15:19*	*1*

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 13:37	1
Toluene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 13:37	1
Ethylbenzene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 13:37	1

Client Sample Results

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 600-82102-1
Project/Site: HES Transfer Sites, Lea County NM

Client Sample ID: VGWUSAT2-01-05 — Lab Sample ID: 600-82102-2

Date Collected: 10/30/13 10:01 — Matrix: Solid
Date Received: 11/04/13 14:42 — Percent Solids: 93.7

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 13:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*98*		*43 - 141*	*11/06/13 10:13*	*11/13/13 13:37*	*1*
a,a,a-Trifluorotoluene	*87*		*44 - 134*	*11/06/13 10:13*	*11/13/13 13:37*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		8.9		mg/Kg	☼	11/05/13 14:52	11/07/13 20:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*127*		*60 - 140*	*11/05/13 14:52*	*11/07/13 20:50*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**6.3**		1.0		%			11/05/13 15:31	1
Percent Solids	**94**		1.0		%			11/05/13 15:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1300**		43		mg/Kg	☼		11/18/13 12:30	10

Client Sample ID: VGWUSAT2-01-10 — Lab Sample ID: 600-82102-3

Date Collected: 10/30/13 10:03 — Matrix: Solid
Date Received: 11/04/13 14:42 — Percent Solids: 82.2

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.2		mg/Kg	☼	11/06/13 09:18	11/06/13 15:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*107*		*50 - 150*	*11/06/13 09:18*	*11/06/13 15:44*	*1*
4-Bromofluorobenzene	*102*		*50 - 150*	*11/06/13 09:18*	*11/06/13 15:44*	*1*

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 13:59	1
Toluene	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 13:59	1
Ethylbenzene	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 13:59	1
Xylenes, Total	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 13:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*95*		*43 - 141*	*11/06/13 10:13*	*11/13/13 13:59*	*1*
a,a,a-Trifluorotoluene	*95*		*44 - 134*	*11/06/13 10:13*	*11/13/13 13:59*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		10		mg/Kg	☼	11/05/13 14:52	11/07/13 21:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*130*		*60 - 140*	*11/05/13 14:52*	*11/07/13 21:24*	*1*

Client Sample Results

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 600-82102-1
Project/Site: HES Transfer Sites, Lea County NM

Client Sample ID: VGWUSAT2-01-10 — Lab Sample ID: 600-82102-3

Date Collected: 10/30/13 10:03 Matrix: Solid
Date Received: 11/04/13 14:42

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18		1.0		%			11/05/13 15:31	1
Percent Solids	82		1.0		%			11/05/13 15:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	960		9.7		mg/Kg	☼		11/16/13 06:14	2

Client Sample ID: VGWUSAT2-01-15 — Lab Sample ID: 600-82102-4

Date Collected: 10/30/13 10:05 Matrix: Solid
Date Received: 11/04/13 14:42 Percent Solids: 95.0

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.1		mg/Kg	☼	11/06/13 09:18	11/06/13 16:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*106*		*50 - 150*	*11/06/13 09:18*	*11/06/13 16:10*	*1*
4-Bromofluorobenzene	*101*		*50 - 150*	*11/06/13 09:18*	*11/06/13 16:10*	*1*

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 14:21	1
Toluene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 14:21	1
Ethylbenzene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 14:21	1
Xylenes, Total	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 14:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*106*		*43 - 141*	*11/06/13 10:13*	*11/13/13 14:21*	*1*
a,a,a-Trifluorotoluene	*98*		*44 - 134*	*11/06/13 10:13*	*11/13/13 14:21*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		8.7		mg/Kg	☼	11/05/13 14:52	11/07/13 21:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*123*		*60 - 140*	*11/05/13 14:52*	*11/07/13 21:57*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.0		1.0		%			11/05/13 15:31	1
Percent Solids	95		1.0		%			11/05/13 15:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1000		8.4		mg/Kg	☼		11/16/13 06:29	2

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Client Sample ID: VGWUSAT2-01-20

Lab Sample ID: 600-82102-5
Date Collected: 10/30/13 10:06
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 72.6

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.4		mg/Kg	☼	11/06/13 09:18	11/06/13 16:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*106*		*50 - 150*	*11/06/13 09:18*	*11/06/13 16:34*	*1*
4-Bromofluorobenzene	*101*		*50 - 150*	*11/06/13 09:18*	*11/06/13 16:34*	*1*

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.028		mg/Kg	☼	11/06/13 10:13	11/13/13 14:43	1
Toluene	ND		0.028		mg/Kg	☼	11/06/13 10:13	11/13/13 14:43	1
Ethylbenzene	ND		0.028		mg/Kg	☼	11/06/13 10:13	11/13/13 14:43	1
Xylenes, Total	ND		0.028		mg/Kg	☼	11/06/13 10:13	11/13/13 14:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*121*		*43 - 141*	*11/06/13 10:13*	*11/13/13 14:43*	*1*
a,a,a-Trifluorotoluene	*114*		*44 - 134*	*11/06/13 10:13*	*11/13/13 14:43*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		11		mg/Kg	☼	11/05/13 14:52	11/07/13 22:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*133*		*60 - 140*	*11/05/13 14:52*	*11/07/13 22:30*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**27**		1.0		%			11/05/13 15:31	1
Percent Solids	**73**		1.0		%			11/05/13 15:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1000**		11		mg/Kg	☼		11/16/13 03:00	2

Client Sample ID: VGWUSAT2-01-25

Lab Sample ID: 600-82102-6
Date Collected: 10/30/13 10:08
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 82.6

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.2		mg/Kg	☼	11/06/13 09:18	11/06/13 17:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*106*		*50 - 150*	*11/06/13 09:18*	*11/06/13 17:00*	*1*
4-Bromofluorobenzene	*100*		*50 - 150*	*11/06/13 09:18*	*11/06/13 17:00*	*1*

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 15:06	1
Toluene	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 15:06	1
Ethylbenzene	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 15:06	1

Client Sample Results

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 600-82102-1
Project/Site: HES Transfer Sites, Lea County NM

Client Sample ID: VGWUSAT2-01-25 — Lab Sample ID: 600-82102-6

Date Collected: 10/30/13 10:08 — Matrix: Solid
Date Received: 11/04/13 14:42 — Percent Solids: 82.6

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		0.024		mg/Kg	☼	11/06/13 10:13	11/13/13 15:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*101*		*43 - 141*	*11/06/13 10:13*	*11/13/13 15:06*	*1*
a,a,a-Trifluorotoluene	*102*		*44 - 134*	*11/06/13 10:13*	*11/13/13 15:06*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		10		mg/Kg	☼	11/06/13 13:43	11/08/13 09:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*68*		*60 - 140*	*11/06/13 13:43*	*11/08/13 09:00*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**17**		1.0		%			11/05/13 15:31	1
Percent Solids	**83**		1.0		%			11/05/13 15:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**620**		9.7		mg/Kg	☼		11/16/13 03:14	2

Client Sample ID: VGWUSAT2-01-30 — Lab Sample ID: 600-82102-19

Date Collected: 10/30/13 10:10 — Matrix: Solid
Date Received: 11/04/13 14:42 — Percent Solids: 93.8

Method: 8015B - Gasoline Range Organics - (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.1		mg/Kg	☼	11/06/13 09:18	11/06/13 18:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*105*		*50 - 150*	*11/06/13 09:18*	*11/06/13 18:18*	*1*
4-Bromofluorobenzene	*95*		*50 - 150*	*11/06/13 09:18*	*11/06/13 18:18*	*1*

Method: 8021B - Volatile Organic Compounds (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 15:28	1
Toluene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 15:28	1
Ethylbenzene	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 15:28	1
Xylenes, Total	ND		0.021		mg/Kg	☼	11/06/13 10:13	11/13/13 15:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*106*		*43 - 141*	*11/06/13 10:13*	*11/13/13 15:28*	*1*
a,a,a-Trifluorotoluene	*106*		*44 - 134*	*11/06/13 10:13*	*11/13/13 15:28*	*1*

Method: 8015B - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		8.8		mg/Kg	☼	11/05/13 14:52	11/07/13 23:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*128*		*60 - 140*	*11/05/13 14:52*	*11/07/13 23:37*	*1*

Client Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Client Sample ID: VGWUSAT2-01-30
Date Collected: 10/30/13 10:10
Date Received: 11/04/13 14:42

Lab Sample ID: 600-82102-19
Matrix: Solid

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.2		1.0		%			11/05/13 15:31	1
Percent Solids	94		1.0		%			11/05/13 15:31	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	85		4.3		mg/Kg	☼		11/16/13 03:27	1

Definitions/Glossary

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 600-82102-1
Project/Site: HES Transfer Sites, Lea County NM

Qualifiers

General Chemistry

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Method: 8015B - Gasoline Range Organics - (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
Lab Sample ID	Client Sample ID	TFT1 (50-150)	BFB1 (50-150)								
600-82102-1	VGWUSAT2-01-02	108	104								
600-82102-1 MS	VGWUSAT2-01-02	105	105								
600-82102-1 MSD	VGWUSAT2-01-02	105	104								
600-82102-2	VGWUSAT2-01-05	106	100								
600-82102-3	VGWUSAT2-01-10	107	102								
600-82102-4	VGWUSAT2-01-15	106	101								
600-82102-5	VGWUSAT2-01-20	106	101								
600-82102-6	VGWUSAT2-01-25	106	100								
600-82102-19	VGWUSAT2-01-30	105	95								
LCS 600-120569/1-A	Lab Control Sample	107	96								
MB 600-120569/2-A	Method Blank	106	98								

Surrogate Legend

TFT = a,a,a-Trifluorotoluene

BFB = 4-Bromofluorobenzene

Method: 8021B - Volatile Organic Compounds (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
Lab Sample ID	Client Sample ID	BFB1 (43-141)	TFT1 (44-134)								
600-82102-1	VGWUSAT2-01-02	127	110								
600-82102-2	VGWUSAT2-01-05	98	87								
600-82102-2 MS	VGWUSAT2-01-05	101	102								
600-82102-2 MSD	VGWUSAT2-01-05	96	96								
600-82102-3	VGWUSAT2-01-10	95	95								
600-82102-4	VGWUSAT2-01-15	106	98								
600-82102-5	VGWUSAT2-01-20	121	114								
600-82102-6	VGWUSAT2-01-25	101	102								
600-82102-19	VGWUSAT2-01-30	106	106								
LCS 600-120574/1-A	Lab Control Sample	101	100								
MB 600-120574/2-A	Method Blank	101	102								

Surrogate Legend

BFB = 4-Bromofluorobenzene

TFT = a,a,a-Trifluorotoluene

Method: 8015B - Diesel Range Organics (DRO) (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)									
Lab Sample ID	Client Sample ID	OTPH1 (60-140)									
600-82102-1	VGWUSAT2-01-02	134									
600-82102-2	VGWUSAT2-01-05	127									
600-82102-3	VGWUSAT2-01-10	130									
600-82102-4	VGWUSAT2-01-15	123									
600-82102-5	VGWUSAT2-01-20	133									
600-82102-6	VGWUSAT2-01-25	68									

Surrogate Summary

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	OTPH1 (60-140)							
600-82102-6 MS	VGWUSAT2-01-25	94							
600-82102-6 MSD	VGWUSAT2-01-25	89							
600-82102-19	VGWUSAT2-01-30	128							
LCS 600-119796/2-A	Lab Control Sample	94							
MB 600-119796/1-A	Method Blank	67							

Surrogate Legend

OTPH = o-Terphenyl

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Method: 8015B - Gasoline Range Organics - (GC)

Lab Sample ID: MB 600-120569/2-A
Matrix: Solid
Analysis Batch: 120821

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 120569

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
WI Gasoline Range Organics (C6-C10)	ND		1.0		mg/Kg		11/06/13 09:18	11/06/13 14:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*106*		*50 - 150*	*11/06/13 09:18*	*11/06/13 14:29*	*1*
4-Bromofluorobenzene	*98*		*50 - 150*	*11/06/13 09:18*	*11/06/13 14:29*	*1*

Lab Sample ID: LCS 600-120569/1-A
Matrix: Solid
Analysis Batch: 120821

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 120569

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
WI Gasoline Range Organics (C6-C10)	5.00	4.94		mg/Kg		99	49 - 151

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
a,a,a-Trifluorotoluene	*107*		*50 - 150*
4-Bromofluorobenzene	*96*		*50 - 150*

Lab Sample ID: 600-82102-1 MS
Matrix: Solid
Analysis Batch: 120821

Client Sample ID: VGWUSAT2-01-02
Prep Type: Total/NA
Prep Batch: 120569

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
WI Gasoline Range Organics (C6-C10)	ND		5.40	4.58		mg/Kg	☼	85	50 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
a,a,a-Trifluorotoluene	*105*		*50 - 150*
4-Bromofluorobenzene	*105*		*50 - 150*

Lab Sample ID: 600-82102-1 MSD
Matrix: Solid
Analysis Batch: 120821

Client Sample ID: VGWUSAT2-01-02
Prep Type: Total/NA
Prep Batch: 120569

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
WI Gasoline Range Organics (C6-C10)	ND		5.40	4.75		mg/Kg	☼	88	50 - 150	4	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
a,a,a-Trifluorotoluene	*105*		*50 - 150*
4-Bromofluorobenzene	*104*		*50 - 150*

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Method: 8021B - Volatile Organic Compounds (GC)

Lab Sample ID: MB 600-120574/2-A
Matrix: Solid
Analysis Batch: 120568

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 120574

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.020		mg/Kg		11/06/13 10:13	11/13/13 12:50	1
Toluene	ND		0.020		mg/Kg		11/06/13 10:13	11/13/13 12:50	1
Ethylbenzene	ND		0.020		mg/Kg		11/06/13 10:13	11/13/13 12:50	1
Xylenes, Total	ND		0.020		mg/Kg		11/06/13 10:13	11/13/13 12:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*101*		*43 - 141*	*11/06/13 10:13*	*11/13/13 12:50*	*1*
a,a,a-Trifluorotoluene	*102*		*44 - 134*	*11/06/13 10:13*	*11/13/13 12:50*	*1*

Lab Sample ID: LCS 600-120574/1-A
Matrix: Solid
Analysis Batch: 120568

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 120574

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	1.00	1.00		mg/Kg		100	69 - 133
Toluene	1.00	1.01		mg/Kg		101	70 - 134
Ethylbenzene	1.00	1.00		mg/Kg		100	71 - 139
Xylenes, Total	3.01	3.08		mg/Kg		102	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene	*101*		*43 - 141*
a,a,a-Trifluorotoluene	*100*		*44 - 134*

Lab Sample ID: 600-82102-2 MS
Matrix: Solid
Analysis Batch: 120568

Client Sample ID: VGWUSAT2-01-05
Prep Type: Total/NA
Prep Batch: 120574

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	ND		1.07	1.06		mg/Kg	☼	100	50 - 150
Toluene	ND		1.07	1.10		mg/Kg	☼	103	50 - 150
Ethylbenzene	ND		1.07	1.09		mg/Kg	☼	102	50 - 150
Xylenes, Total	ND		3.20	3.30		mg/Kg	☼	103	50 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene	*101*		*43 - 141*
a,a,a-Trifluorotoluene	*102*		*44 - 134*

Lab Sample ID: 600-82102-2 MSD
Matrix: Solid
Analysis Batch: 120568

Client Sample ID: VGWUSAT2-01-05
Prep Type: Total/NA
Prep Batch: 120574

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	ND		1.07	1.02		mg/Kg	☼	96	50 - 150	4	20
Toluene	ND		1.07	1.02		mg/Kg	☼	96	50 - 150	7	20
Ethylbenzene	ND		1.07	1.00		mg/Kg	☼	94	50 - 150	8	20
Xylenes, Total	ND		3.20	3.01		mg/Kg	☼	94	50 - 150	9	20

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Method: 8021B - Volatile Organic Compounds (GC) (Continued)

Lab Sample ID: 600-82102-2 MSD
Matrix: Solid
Analysis Batch: 120568

Client Sample ID: VGWUSAT2-01-05
Prep Type: Total/NA
Prep Batch: 120574

Surrogate	MSD %Recovery	MSD Qualifier	Limits
4-Bromofluorobenzene	96		43 - 141
a,a,a-Trifluorotoluene	96		44 - 134

Method: 8015B - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 600-119796/1-A
Matrix: Solid
Analysis Batch: 120123

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 119796

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		8.3		mg/Kg		11/06/13 13:43	11/08/13 07:54	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	67		60 - 140	11/06/13 13:43	11/08/13 07:54	1

Lab Sample ID: LCS 600-119796/2-A
Matrix: Solid
Analysis Batch: 120123

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 119796

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Diesel Range Organics [C10-C28]			33.3	29.8		mg/Kg		90	70 - 130		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	94		60 - 140

Lab Sample ID: 600-82102-6 MS
Matrix: Solid
Analysis Batch: 120123

Client Sample ID: VGWUSAT2-01-25
Prep Type: Total/NA
Prep Batch: 119796

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Diesel Range Organics [C10-C28]	ND		40.3	35.0		mg/Kg	☼	87	70 - 130		

Surrogate	MS %Recovery	MS Qualifier	Limits
o-Terphenyl	94		60 - 140

Lab Sample ID: 600-82102-6 MSD
Matrix: Solid
Analysis Batch: 120123

Client Sample ID: VGWUSAT2-01-25
Prep Type: Total/NA
Prep Batch: 119796

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	ND		40.3	33.8		mg/Kg	☼	84	70 - 130	3	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
o-Terphenyl	89		60 - 140

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 600-120660/1-A
Matrix: Solid
Analysis Batch: 120678

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		4.0		mg/Kg			11/16/13 02:33	1

Lab Sample ID: LCS 600-120660/2-A
Matrix: Solid
Analysis Batch: 120678

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	200	210		mg/Kg		105	90 - 110

Lab Sample ID: MB 600-120660/1-A
Matrix: Solid
Analysis Batch: 120730

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.95		4.0		mg/Kg			11/16/13 07:47	1

Lab Sample ID: LCS 600-120660/2-A
Matrix: Solid
Analysis Batch: 120730

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	200	191		mg/Kg		95	90 - 110

Lab Sample ID: 600-82102-4 MS
Matrix: Solid
Analysis Batch: 120730

Client Sample ID: VGWUSAT2-01-15
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1000		211	1200	4	mg/Kg	☼	77	80 - 120

Lab Sample ID: 600-82102-4 MSD
Matrix: Solid
Analysis Batch: 120730

Client Sample ID: VGWUSAT2-01-15
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1000		211	1190	4	mg/Kg	☼	75	80 - 120	0	20

Method: Moisture - Percent Moisture

Lab Sample ID: 600-82102-2 DU
Matrix: Solid
Analysis Batch: 119700

Client Sample ID: VGWUSAT2-01-05
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	6.3		7.3		%		15	20
Percent Solids	94		93		%		1	20

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

GC VOA

Analysis Batch: 120568

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Total/NA	Solid	8021B	120574
600-82102-2	VGWUSAT2-01-05	Total/NA	Solid	8021B	120574
600-82102-2 MS	VGWUSAT2-01-05	Total/NA	Solid	8021B	120574
600-82102-2 MSD	VGWUSAT2-01-05	Total/NA	Solid	8021B	120574
600-82102-3	VGWUSAT2-01-10	Total/NA	Solid	8021B	120574
600-82102-4	VGWUSAT2-01-15	Total/NA	Solid	8021B	120574
600-82102-5	VGWUSAT2-01-20	Total/NA	Solid	8021B	120574
600-82102-6	VGWUSAT2-01-25	Total/NA	Solid	8021B	120574
600-82102-19	VGWUSAT2-01-30	Total/NA	Solid	8021B	120574
LCS 600-120574/1-A	Lab Control Sample	Total/NA	Solid	8021B	120574
MB 600-120574/2-A	Method Blank	Total/NA	Solid	8021B	120574

Prep Batch: 120569

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Total/NA	Solid	5030B	
600-82102-1 MS	VGWUSAT2-01-02	Total/NA	Solid	5030B	
600-82102-1 MSD	VGWUSAT2-01-02	Total/NA	Solid	5030B	
600-82102-2	VGWUSAT2-01-05	Total/NA	Solid	5030B	
600-82102-3	VGWUSAT2-01-10	Total/NA	Solid	5030B	
600-82102-4	VGWUSAT2-01-15	Total/NA	Solid	5030B	
600-82102-5	VGWUSAT2-01-20	Total/NA	Solid	5030B	
600-82102-6	VGWUSAT2-01-25	Total/NA	Solid	5030B	
600-82102-19	VGWUSAT2-01-30	Total/NA	Solid	5030B	
LCS 600-120569/1-A	Lab Control Sample	Total/NA	Solid	5030B	
MB 600-120569/2-A	Method Blank	Total/NA	Solid	5030B	

Prep Batch: 120574

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Total/NA	Solid	5030B	
600-82102-2	VGWUSAT2-01-05	Total/NA	Solid	5030B	
600-82102-2 MS	VGWUSAT2-01-05	Total/NA	Solid	5030B	
600-82102-2 MSD	VGWUSAT2-01-05	Total/NA	Solid	5030B	
600-82102-3	VGWUSAT2-01-10	Total/NA	Solid	5030B	
600-82102-4	VGWUSAT2-01-15	Total/NA	Solid	5030B	
600-82102-5	VGWUSAT2-01-20	Total/NA	Solid	5030B	
600-82102-6	VGWUSAT2-01-25	Total/NA	Solid	5030B	
600-82102-19	VGWUSAT2-01-30	Total/NA	Solid	5030B	
LCS 600-120574/1-A	Lab Control Sample	Total/NA	Solid	5030B	
MB 600-120574/2-A	Method Blank	Total/NA	Solid	5030B	

Analysis Batch: 120821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Total/NA	Solid	8015B	120569
600-82102-1 MS	VGWUSAT2-01-02	Total/NA	Solid	8015B	120569
600-82102-1 MSD	VGWUSAT2-01-02	Total/NA	Solid	8015B	120569
600-82102-2	VGWUSAT2-01-05	Total/NA	Solid	8015B	120569
600-82102-3	VGWUSAT2-01-10	Total/NA	Solid	8015B	120569
600-82102-4	VGWUSAT2-01-15	Total/NA	Solid	8015B	120569
600-82102-5	VGWUSAT2-01-20	Total/NA	Solid	8015B	120569
600-82102-6	VGWUSAT2-01-25	Total/NA	Solid	8015B	120569
600-82102-19	VGWUSAT2-01-30	Total/NA	Solid	8015B	120569

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

GC VOA (Continued)

Analysis Batch: 120821 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 600-120569/1-A	Lab Control Sample	Total/NA	Solid	8015B	120569
MB 600-120569/2-A	Method Blank	Total/NA	Solid	8015B	120569

GC Semi VOA

Prep Batch: 119687

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Total/NA	Solid	3550B	
600-82102-2	VGWUSAT2-01-05	Total/NA	Solid	3550B	
600-82102-3	VGWUSAT2-01-10	Total/NA	Solid	3550B	
600-82102-4	VGWUSAT2-01-15	Total/NA	Solid	3550B	
600-82102-5	VGWUSAT2-01-20	Total/NA	Solid	3550B	
600-82102-19	VGWUSAT2-01-30	Total/NA	Solid	3550B	

Prep Batch: 119796

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-6	VGWUSAT2-01-25	Total/NA	Solid	3550B	
600-82102-6 MS	VGWUSAT2-01-25	Total/NA	Solid	3550B	
600-82102-6 MSD	VGWUSAT2-01-25	Total/NA	Solid	3550B	
LCS 600-119796/2-A	Lab Control Sample	Total/NA	Solid	3550B	
MB 600-119796/1-A	Method Blank	Total/NA	Solid	3550B	

Analysis Batch: 120123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Total/NA	Solid	8015B	119687
600-82102-2	VGWUSAT2-01-05	Total/NA	Solid	8015B	119687
600-82102-3	VGWUSAT2-01-10	Total/NA	Solid	8015B	119687
600-82102-4	VGWUSAT2-01-15	Total/NA	Solid	8015B	119687
600-82102-5	VGWUSAT2-01-20	Total/NA	Solid	8015B	119687
600-82102-6	VGWUSAT2-01-25	Total/NA	Solid	8015B	119796
600-82102-6 MS	VGWUSAT2-01-25	Total/NA	Solid	8015B	119796
600-82102-6 MSD	VGWUSAT2-01-25	Total/NA	Solid	8015B	119796
600-82102-19	VGWUSAT2-01-30	Total/NA	Solid	8015B	119687
LCS 600-119796/2-A	Lab Control Sample	Total/NA	Solid	8015B	119796
MB 600-119796/1-A	Method Blank	Total/NA	Solid	8015B	119796

General Chemistry

Analysis Batch: 119700

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Total/NA	Solid	Moisture	
600-82102-2	VGWUSAT2-01-05	Total/NA	Solid	Moisture	
600-82102-2 DU	VGWUSAT2-01-05	Total/NA	Solid	Moisture	
600-82102-3	VGWUSAT2-01-10	Total/NA	Solid	Moisture	
600-82102-4	VGWUSAT2-01-15	Total/NA	Solid	Moisture	
600-82102-5	VGWUSAT2-01-20	Total/NA	Solid	Moisture	
600-82102-6	VGWUSAT2-01-25	Total/NA	Solid	Moisture	
600-82102-19	VGWUSAT2-01-30	Total/NA	Solid	Moisture	

QC Association Summary

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

General Chemistry (Continued)

Leach Batch: 120660

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-3	VGWUSAT2-01-10	Soluble	Solid	DI Leach	
600-82102-4	VGWUSAT2-01-15	Soluble	Solid	DI Leach	
600-82102-4 MS	VGWUSAT2-01-15	Soluble	Solid	DI Leach	
600-82102-4 MSD	VGWUSAT2-01-15	Soluble	Solid	DI Leach	
600-82102-5	VGWUSAT2-01-20	Soluble	Solid	DI Leach	
600-82102-6	VGWUSAT2-01-25	Soluble	Solid	DI Leach	
600-82102-19	VGWUSAT2-01-30	Soluble	Solid	DI Leach	
LCS 600-120660/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
MB 600-120660/1-A	Method Blank	Soluble	Solid	DI Leach	

Analysis Batch: 120678

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-5	VGWUSAT2-01-20	Soluble	Solid	9056	120660
600-82102-6	VGWUSAT2-01-25	Soluble	Solid	9056	120660
600-82102-19	VGWUSAT2-01-30	Soluble	Solid	9056	120660
LCS 600-120660/2-A	Lab Control Sample	Soluble	Solid	9056	120660
MB 600-120660/1-A	Method Blank	Soluble	Solid	9056	120660

Analysis Batch: 120730

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-3	VGWUSAT2-01-10	Soluble	Solid	9056	120660
600-82102-4	VGWUSAT2-01-15	Soluble	Solid	9056	120660
600-82102-4 MS	VGWUSAT2-01-15	Soluble	Solid	9056	120660
600-82102-4 MSD	VGWUSAT2-01-15	Soluble	Solid	9056	120660
LCS 600-120660/2-A	Lab Control Sample	Soluble	Solid	9056	120660
MB 600-120660/1-A	Method Blank	Soluble	Solid	9056	120660

Leach Batch: 120762

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Soluble	Solid	DI Leach	
600-82102-2	VGWUSAT2-01-05	Soluble	Solid	DI Leach	

Analysis Batch: 120779

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-82102-1	VGWUSAT2-01-02	Soluble	Solid	9056	120762
600-82102-2	VGWUSAT2-01-05	Soluble	Solid	9056	120762

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Client Sample ID: VGWUSAT2-01-02

Lab Sample ID: 600-82102-1

Date Collected: 10/30/13 10:00
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 92.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			10 g	10 mL	120574	11/06/13 10:13	MHT	TAL HOU
Total/NA	Analysis	8021B		1	10 g	10 mL	120568	11/13/13 18:12	MHT	TAL HOU
Total/NA	Prep	5030B			10 g	200 mL	120569	11/06/13 09:18	MHT	TAL HOU
Total/NA	Analysis	8015B		1	10 g	200 mL	120821	11/06/13 14:54	MHT	TAL HOU
Total/NA	Prep	3550B			30.18 g	1.0 mL	119687	11/05/13 14:52	EAT	TAL HOU
Total/NA	Analysis	8015B		1	30.18 g	1.0 mL	120123	11/07/13 20:17	JPS	TAL HOU
Total/NA	Analysis	Moisture		1			119700	11/05/13 15:31	AYS	TAL HOU
Soluble	Leach	DI Leach			5 g	50 mL	120762	11/18/13 11:22	DAW	TAL HOU
Soluble	Analysis	9056		10	5 mL	5 mL	120779	11/18/13 12:17	DAW	TAL HOU

Client Sample ID: VGWUSAT2-01-05

Lab Sample ID: 600-82102-2

Date Collected: 10/30/13 10:01
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 93.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			10 g	10 mL	120574	11/06/13 10:13	MHT	TAL HOU
Total/NA	Analysis	8021B		1	10 g	10 mL	120568	11/13/13 13:37	MHT	TAL HOU
Total/NA	Prep	5030B			10 g	200 mL	120569	11/06/13 09:18	MHT	TAL HOU
Total/NA	Analysis	8015B		1	10 g	200 mL	120821	11/06/13 15:19	MHT	TAL HOU
Total/NA	Prep	3550B			30.01 g	1.0 mL	119687	11/05/13 14:52	EAT	TAL HOU
Total/NA	Analysis	8015B		1	30.01 g	1.0 mL	120123	11/07/13 20:50	JPS	TAL HOU
Total/NA	Analysis	Moisture		1			119700	11/05/13 15:31	AYS	TAL HOU
Soluble	Leach	DI Leach			5 g	50 mL	120762	11/18/13 11:22	DAW	TAL HOU
Soluble	Analysis	9056		10	5 mL	5 mL	120779	11/18/13 12:30	DAW	TAL HOU

Client Sample ID: VGWUSAT2-01-10

Lab Sample ID: 600-82102-3

Date Collected: 10/30/13 10:03
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 82.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			10 g	10 mL	120574	11/06/13 10:13	MHT	TAL HOU
Total/NA	Analysis	8021B		1	10 g	10 mL	120568	11/13/13 13:59	MHT	TAL HOU
Total/NA	Prep	5030B			10 g	200 mL	120569	11/06/13 09:18	MHT	TAL HOU
Total/NA	Analysis	8015B		1	10 g	200 mL	120821	11/06/13 15:44	MHT	TAL HOU
Total/NA	Prep	3550B			30.01 g	1.0 mL	119687	11/05/13 14:52	EAT	TAL HOU
Total/NA	Analysis	8015B		1	30.01 g	1.0 mL	120123	11/07/13 21:24	JPS	TAL HOU
Total/NA	Analysis	Moisture		1			119700	11/05/13 15:31	AYS	TAL HOU
Soluble	Leach	DI Leach			5 g	50 mL	120660	11/15/13 10:00	KRD	TAL HOU
Soluble	Analysis	9056		2	5 mL	5 mL	120730	11/16/13 06:14	DAW	TAL HOU

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Client Sample ID: VGWUSAT2-01-15

Lab Sample ID: 600-82102-4

Date Collected: 10/30/13 10:05
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 95.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			10 g	10 mL	120574	11/06/13 10:13	MHT	TAL HOU
Total/NA	Analysis	8021B		1	10 g	10 mL	120568	11/13/13 14:21	MHT	TAL HOU
Total/NA	Prep	5030B			10 g	200 mL	120569	11/06/13 09:18	MHT	TAL HOU
Total/NA	Analysis	8015B		1	10 g	200 mL	120821	11/06/13 16:10	MHT	TAL HOU
Total/NA	Prep	3550B			30.18 g	1.0 mL	119687	11/05/13 14:52	EAT	TAL HOU
Total/NA	Analysis	8015B		1	30.18 g	1.0 mL	120123	11/07/13 21:57	JPS	TAL HOU
Total/NA	Analysis	Moisture		1			119700	11/05/13 15:31	AYS	TAL HOU
Soluble	Leach	DI Leach			5 g	50 mL	120660	11/15/13 10:00	KRD	TAL HOU
Soluble	Analysis	9056		2	5 mL	5 mL	120730	11/16/13 06:29	DAW	TAL HOU

Client Sample ID: VGWUSAT2-01-20

Lab Sample ID: 600-82102-5

Date Collected: 10/30/13 10:06
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 72.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			10 g	10 mL	120574	11/06/13 10:13	MHT	TAL HOU
Total/NA	Analysis	8021B		1	10 g	10 mL	120568	11/13/13 14:43	MHT	TAL HOU
Total/NA	Prep	5030B			10 g	200 mL	120569	11/06/13 09:18	MHT	TAL HOU
Total/NA	Analysis	8015B		1	10 g	200 mL	120821	11/06/13 16:34	MHT	TAL HOU
Total/NA	Prep	3550B			30.10 g	1.0 mL	119687	11/05/13 14:52	EAT	TAL HOU
Total/NA	Analysis	8015B		1	30.10 g	1.0 mL	120123	11/07/13 22:30	JPS	TAL HOU
Total/NA	Analysis	Moisture		1			119700	11/05/13 15:31	AYS	TAL HOU
Soluble	Leach	DI Leach			5 g	50 mL	120660	11/15/13 10:00	KRD	TAL HOU
Soluble	Analysis	9056		2	5 mL	5 mL	120678	11/16/13 03:00	DAW	TAL HOU

Client Sample ID: VGWUSAT2-01-25

Lab Sample ID: 600-82102-6

Date Collected: 10/30/13 10:08
Matrix: Solid
Date Received: 11/04/13 14:42
Percent Solids: 82.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			10 g	10 mL	120574	11/06/13 10:13	MHT	TAL HOU
Total/NA	Analysis	8021B		1	10 g	10 mL	120568	11/13/13 15:06	MHT	TAL HOU
Total/NA	Prep	5030B			10 g	200 mL	120569	11/06/13 09:18	MHT	TAL HOU
Total/NA	Analysis	8015B		1	10 g	200 mL	120821	11/06/13 17:00	MHT	TAL HOU
Total/NA	Prep	3550B			30.07 g	1.0 mL	119796	11/06/13 13:43	EAT	TAL HOU
Total/NA	Analysis	8015B		1	30.07 g	1.0 mL	120123	11/08/13 09:00	JPS	TAL HOU
Total/NA	Analysis	Moisture		1			119700	11/05/13 15:31	AYS	TAL HOU
Soluble	Leach	DI Leach			5 g	50 mL	120660	11/15/13 10:00	KRD	TAL HOU
Soluble	Analysis	9056		2	5 mL	5 mL	120678	11/16/13 03:14	DAW	TAL HOU

Lab Chronicle

Client: ARCADIS U.S., Inc.
Project/Site: HES Transfer Sites, Lea County NM

TestAmerica Job ID: 600-82102-1

Client Sample ID: VGWUSAT2-01-30
Date Collected: 10/30/13 10:10
Date Received: 11/04/13 14:42

Lab Sample ID: 600-82102-19
Matrix: Solid
Percent Solids: 93.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			10 g	10 mL	120574	11/06/13 10:13	MHT	TAL HOU
Total/NA	Analysis	8021B		1	10 g	10 mL	120568	11/13/13 15:28	MHT	TAL HOU
Total/NA	Prep	5030B			10 g	200 mL	120569	11/06/13 09:18	MHT	TAL HOU
Total/NA	Analysis	8015B		1	10 g	200 mL	120821	11/06/13 18:18	MHT	TAL HOU
Total/NA	Prep	3550B			30.17 g	1.0 mL	119687	11/05/13 14:52	EAT	TAL HOU
Total/NA	Analysis	8015B		1	30.17 g	1.0 mL	120123	11/07/13 23:37	JPS	TAL HOU
Total/NA	Analysis	Moisture		1			119700	11/05/13 15:31	AYS	TAL HOU
Soluble	Leach	DI Leach			5 g	50 mL	120660	11/15/13 10:00	KRD	TAL HOU
Soluble	Analysis	9056		1	5 mL	5 mL	120678	11/16/13 03:27	DAW	TAL HOU

Laboratory References:

TAL HOU = TestAmerica Houston, 6310 Rothway Street, Houston, TX 77040, TEL (713)690-4444

Certification Summary

Client: ARCADIS U.S., Inc. TestAmerica Job ID: 600-82102-1
Project/Site: HES Transfer Sites, Lea County NM

Laboratory: TestAmerica Houston

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Arkansas DEQ	State Program	6	88-0759	08-04-14
Louisiana	NELAP	6	30643	06-30-14
Oklahoma	State Program	6	9503	08-31-13 *
Texas	NELAP	6	T104704223	10-31-14
USDA	Federal		P330-08-00217	04-01-14
Utah	NELAP	8	TX00083	10-31-13 *

* Expired certification is currently pending renewal and is considered valid.

TestAmerica Houston
6310 Rothway Street
Houston, TX 77040
Phone (713) 690-4444 Fax (713) 690-5646

Chain of Custody Record

600-82102 Chain of Custody

Page 1 of 3

Client Information	Sampler: MELISA PHANI BREHIEL	Lab PM: Kudchadkar, Sachin G	Carrier Tracking No:
Client Contact: Mr. Jonathan Olsen	Phone: 7139534800	E-Mail: sachin.kudchadkar@testamericainc.com	
Company: ARCADIS U.S., Inc.			Job #:
Address: 2929 Briarpark Drive Suite 300	Due Date Requested:		
City: Houston	TAT Requested (days): STANDARD		
State, Zip: TX, 77042			
Phone: 713 953 4800	PO #: Purchase Order Requested		
Email: jonathan.olsen@arcadis-us.com	WO #:		
Project Name: HES Transfer Sites, Lea County NM	Project #: 60004633		
Site: VGWU SATELLITE 2	SSOW#:		

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015B_DRO	9056_28D - Chloride	8015B_GRO	8021B- BTEX	ASTM-D2216	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N	Z		
VGWUSAT2-01-02	10/30/13	1000	G	Solid			X	X	X	X	X		~~HOLD OK~~ (up)
VGWUSAT2-01-05		1001		Solid			X	X	X	X	X		
VGWUSAT2-01-10		1003		Solid			X	X	X	X	X		
VGWUSAT2-01-15		1005		Solid			X	X	X	X	X		
VGWUSAT2-01-20		1006		Solid			X	X	X	X	X		
VGWUSAT2-01-25		1008		Solid			X	X	X	X	X		
VGWUSAT2-02-02		1040		Solid			X	X	X	X	X		HOLD
VGWUSAT2-02-05		1042		Solid			X	X	X	X	X		HOLD
VGWUSAT2-02-10		1044		Solid			X	X	X	X	X		HOLD
VGWUSAT2-02-15		1047		Solid			X	X	X	X	X		HOLD
VGWUSAT2-02-20		1049		Solid			X	X	X	X	X		HOLD

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		11/1/13 540				
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 11/4/13 1442	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica Houston
6310 Rothway Street
Houston, TX 77040
Phone (713) 690-4444 Fax (713) 690-5646

Chain of Custody Record

Client Information	Sampler: MPHAN/BKREHEL	Lab PM: Kudchadkar, Sachin G	Carrier Tracking No(s):	COC No: 600-23595-8666.1
Client Contact: Mr. Jonathan Olsen	Phone: 713 953 4800	E-Mail: sachin.kudchadkar@testamericainc.com		Page: Page 2 of 3
Company: ARCADIS U.S., Inc.		Analysis Requested		Job #:
Address: 2929 Briarpark Drive Suite 300	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
City: Houston	TAT Requested (days): STANDARD			
State, Zip: TX, 77042				
Phone: 713 953 4800	PO #: Purchase Order Requested			
Email: jonathan.olsen@arcadis-us.com	WO #:			
Project Name: HES Transfer Sites, Lea County NM	Project #: 60004633			Other:
Site: VGWU SATELLITE 2	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015B_DRO	9056_28D - Chloride	8015B_GRO	8021B- BTEX	ASTM-D2216	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N	Z		
VGWUSAT2-02-25	10/30/13	1051	G	Solid			X	X	X	X	X		HOLD
VGWUSAT2-03-02		1102		Solid			X	X	X	X	X		
VGWUSAT2-03-05		1104		Solid			X	X	X	X	X		
VGWUSAT2-03-10		1107		Solid			X	X	X	X	X		
~~VGWU~~ VGWUSAT2-03-15		1109		Solid			X	X	X	X	X		
VGWUSAT2-03-20		1110		Solid			X	X	X	X	X		
VGWUSAT2-03-25		1113		Solid			X	X	X	X	X		
~~VGWUSAT2-04-02~~				Solid			X	X	X	X	X		
~~VGWUSAT2-04-05~~				Solid			X	X	X	X	X		
~~VGWUSAT2-04-10~~				Solid			X	X	X	X	X		
~~VGWUSAT2-04-15~~				Solid			X	X	X	X	X		

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/1/13 540			11/4/13	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/4/13 1442			11/4/13 1442	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

TestAmerica Houston
6310 Rothway Street
Houston, TX 77040
Phone (713) 690-4444 Fax (713) 690-5646

Chain of Custody Record

Client Information	Sampler: MPHAN / BKREHTEL	Lab PM: Kudchadkar, Sachin G	Carrier Tracking No(s):	COC No: 600-23595-8666.1
Client Contact: Mr. Jonathan Olsen	Phone: 7139534800	E-Mail: sachin.kudchadkar@testamericainc.com		Page: Page 2 of 3
Company: ARCADIS U.S., Inc.		Analysis Requested		Job #:
Address: 2929 Briarpark Drive Suite 300	Due Date Requested:			Preservation Codes:
City: Houston	TAT Requested (days): STANDARD			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
State, Zip: TX, 77042				
Phone: 7139534800	PO #: Purchase Order Requested			Other:
Email: jonathan.olsen@arcadis-us.com	WO #:			
Project Name: HES Transfer Sites, Lea County NM	Project #: 60004633			
Site: VGWU SATELLITE 2	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8015B_DRO	9056_28D - Chloride	8015B_GRO	8021B- BTEX	ASTM-D2216										Total Number of containers	Special Instructions/Note:
Preservation Code:					X	X	N	N	N	N	N										X	
VGWUSAT2-01-30	10/30/13	1010	G	Solid			X	X	X	X	X											~~HOLD~~ UP HOLD
VGWUSAT2-02-30	↓	1055	↓	Solid			X	X	X	X	X											HOLD
VGWUSAT2-03-30	↓	1120	↓	Solid			X	X	X	X	X											HOLD
~~VGWUSAT2-04-30~~ (VP)				Solid			X	X	X	X	X											↓
				Solid																		
				Solid																		
				Solid																		
				Solid																		
				Solid																		
				Solid																		
				Solid																		

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/1/13 540			11/4/13 1442	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc. Job Number: 600-82102-1

Login Number: 82102 **List Source: TestAmerica Houston**
List Number: 1
Creator: Capps, Dana R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.8/4.1/4.4
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

Eurofins TestAmerica, Houston
6310 Rothway Street
Houston, TX 77040
Tel: (713)690-4444

Laboratory Job ID: 600-196329-1
Client Project/Site: Chevron Soils - Chloride

For:
ARCADIS U.S., Inc.
1004 North Big Spring
Suite 121
Midland, Texas 79701

Attn: Justin W Steinmann

Authorized for release by:
12/16/2019 10:51:44 AM

Sachin Kudchadkar, Senior Project Manager
(713)690-4444
sachin.kudchadkar@testamericainc.com

Client: ARCADIS U.S., Inc.
Project/Site: Chevron Soils - Chloride

Laboratory Job ID: 600-196329-1

Table of Contents

Method Summary

Client: ARCADIS U.S., Inc. Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL HOU
2540B	Percent Moisture	SM20	TAL HOU
DI Leach	Deionized Water Leaching Procedure (Routine)	ASTM	TAL HOU

Protocol References:

ASTM = ASTM International

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL HOU = Eurofins TestAmerica, Houston, 6310 Rothway Street, Houston, TX 77040, TEL (713)690-4444

Sample Summary

Client: ARCADIS U.S., Inc.
Project/Site: Chevron Soils - Chloride

Job ID: 600-196329-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
600-196329-1	VGWU-SAT2-AB01 (0-1)	Solid	11/20/19 10:38	11/22/19 10:40	
600-196329-2	VGWU-SAT2-AB02 (0-1)	Solid	11/20/19 10:42	11/22/19 10:40	
600-196329-3	VGWU-SAT2-AB03 (0-1)	Solid	11/20/19 10:45	11/22/19 10:40	
600-196329-4	VGWU-SAT2-AB04 (0-1)	Solid	11/20/19 10:47	11/22/19 10:40	
600-196329-5	VGWU-SAT2-AB05 (0-1)	Solid	11/20/19 10:50	11/22/19 10:40	
600-196329-6	VGWU-SAT2-AB06 (0-1)	Solid	11/20/19 10:53	11/22/19 10:40	
600-196329-7	VGWU-SAT2-AB07 (0-1)	Solid	11/20/19 10:57	11/22/19 10:40	

Client Sample Results

Client: ARCADIS U.S., Inc. Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

Client Sample ID: VGWU-SAT2-AB01 (0-1) Lab Sample ID: 600-196329-1

Date Collected: 11/20/19 10:38 Matrix: Solid
Date Received: 11/22/19 10:40

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5630	b	79.7	10.6	mg/Kg			12/12/19 00:05	20

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.0		1.0	1.0	%			11/22/19 20:43	1
Percent Solids	93.0		1.0	1.0	%			11/22/19 20:43	1

Client Sample ID: VGWU-SAT2-AB02 (0-1) Lab Sample ID: 600-196329-2

Date Collected: 11/20/19 10:42 Matrix: Solid
Date Received: 11/22/19 10:40

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2330	b	39.8	5.32	mg/Kg			12/12/19 20:33	10

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.6		1.0	1.0	%			11/22/19 20:43	1
Percent Solids	94.4		1.0	1.0	%			11/22/19 20:43	1

Client Sample ID: VGWU-SAT2-AB03 (0-1) Lab Sample ID: 600-196329-3

Date Collected: 11/20/19 10:45 Matrix: Solid
Date Received: 11/22/19 10:40

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	10.1	b	3.98	0.532	mg/Kg			12/11/19 16:15	1

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	5.2		1.0	1.0	%			11/22/19 20:43	1
Percent Solids	94.8		1.0	1.0	%			11/22/19 20:43	1

Client Sample ID: VGWU-SAT2-AB04 (0-1) Lab Sample ID: 600-196329-4

Date Collected: 11/20/19 10:47 Matrix: Solid
Date Received: 11/22/19 10:40

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	155	b	3.98	0.532	mg/Kg			12/11/19 15:14	1

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.0		1.0	1.0	%			11/22/19 20:43	1
Percent Solids	93.0		1.0	1.0	%			11/22/19 20:43	1

Client Sample Results

Client: ARCADIS U.S., Inc. Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

Client Sample ID: VGWU-SAT2-AB05 (0-1) Lab Sample ID: 600-196329-5

Date Collected: 11/20/19 10:50 **Matrix: Solid**
Date Received: 11/22/19 10:40

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	30.8	b	3.99	0.533	mg/Kg			12/12/19 01:06	1

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.9		1.0	1.0	%			11/22/19 20:43	1
Percent Solids	91.1		1.0	1.0	%			11/22/19 20:43	1

Client Sample ID: VGWU-SAT2-AB06 (0-1) Lab Sample ID: 600-196329-6

Date Collected: 11/20/19 10:53 **Matrix: Solid**
Date Received: 11/22/19 10:40

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	359	b	4.00	0.534	mg/Kg			12/12/19 02:07	1

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11.7		1.0	1.0	%			11/22/19 20:43	1
Percent Solids	88.3		1.0	1.0	%			11/22/19 20:43	1

Client Sample ID: VGWU-SAT2-AB07 (0-1) Lab Sample ID: 600-196329-7

Date Collected: 11/20/19 10:57 **Matrix: Solid**
Date Received: 11/22/19 10:40

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	91.4	b	4.00	0.534	mg/Kg			12/11/19 18:18	1

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.4		1.0	1.0	%			11/22/19 20:43	1
Percent Solids	91.6		1.0	1.0	%			11/22/19 20:43	1

Definitions/Glossary

Client: ARCADIS U.S., Inc. Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
b	The compound was found in the blank and sample
J	Result is less than the MQL but greater than or equal to the SDL and the concentration is an estimated value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

QC Sample Results

Client: ARCADIS U.S., Inc.
Project/Site: Chevron Soils - Chloride

Job ID: 600-196329-1

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 600-282739/1-A
Matrix: Solid
Analysis Batch: 282645

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.322	J	4.00	0.534	mg/Kg			12/11/19 14:33	1

Lab Sample ID: LCS 600-282739/2-A
Matrix: Solid
Analysis Batch: 282645

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	200	206.8		mg/Kg		103	90 - 110

Lab Sample ID: 600-196329-4 MS
Matrix: Solid
Analysis Batch: 282645

Client Sample ID: VGWU-SAT2-AB04 (0-1)
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	155	b	99.6	248.7		mg/Kg		94	80 - 120

Lab Sample ID: 600-196329-4 MSD
Matrix: Solid
Analysis Batch: 282645

Client Sample ID: VGWU-SAT2-AB04 (0-1)
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	155	b	99.6	244.9		mg/Kg		90	80 - 120	2	20

Lab Sample ID: MB 600-282739/1-A
Matrix: Solid
Analysis Batch: 282793

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.080	J	4.00	0.534	mg/Kg			12/12/19 15:47	1

Lab Sample ID: LCS 600-282739/2-A
Matrix: Solid
Analysis Batch: 282793

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	200	205.8		mg/Kg		103	90 - 110

Unadjusted Detection Limits

Client: ARCADIS U.S., Inc.
Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

Method: 9056A - Anions, Ion Chromatography - Soluble

Leach: DI Leach

Analyte	MQL	MDL	Units
Chloride	4.00	0.534	mg/Kg

General Chemistry

Analyte	MQL	MDL	Units
Percent Moisture	1.0	1.0	%
Percent Solids	1.0	1.0	%

QC Association Summary

Client: ARCADIS U.S., Inc. Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

HPLC/IC

Analysis Batch: 282645

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-196329-1	VGWU-SAT2-AB01 (0-1)	Soluble	Solid	9056A	282739
600-196329-3	VGWU-SAT2-AB03 (0-1)	Soluble	Solid	9056A	282739
600-196329-4	VGWU-SAT2-AB04 (0-1)	Soluble	Solid	9056A	282739
600-196329-5	VGWU-SAT2-AB05 (0-1)	Soluble	Solid	9056A	282739
600-196329-6	VGWU-SAT2-AB06 (0-1)	Soluble	Solid	9056A	282739
600-196329-7	VGWU-SAT2-AB07 (0-1)	Soluble	Solid	9056A	282739
MB 600-282739/1-A	Method Blank	Soluble	Solid	9056A	282739
LCS 600-282739/2-A	Lab Control Sample	Soluble	Solid	9056A	282739
600-196329-4 MS	VGWU-SAT2-AB04 (0-1)	Soluble	Solid	9056A	282739
600-196329-4 MSD	VGWU-SAT2-AB04 (0-1)	Soluble	Solid	9056A	282739

Leach Batch: 282739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-196329-1	VGWU-SAT2-AB01 (0-1)	Soluble	Solid	DI Leach	
600-196329-2	VGWU-SAT2-AB02 (0-1)	Soluble	Solid	DI Leach	
600-196329-3	VGWU-SAT2-AB03 (0-1)	Soluble	Solid	DI Leach	
600-196329-4	VGWU-SAT2-AB04 (0-1)	Soluble	Solid	DI Leach	
600-196329-5	VGWU-SAT2-AB05 (0-1)	Soluble	Solid	DI Leach	
600-196329-6	VGWU-SAT2-AB06 (0-1)	Soluble	Solid	DI Leach	
600-196329-7	VGWU-SAT2-AB07 (0-1)	Soluble	Solid	DI Leach	
MB 600-282739/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 600-282739/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
600-196329-4 MS	VGWU-SAT2-AB04 (0-1)	Soluble	Solid	DI Leach	
600-196329-4 MSD	VGWU-SAT2-AB04 (0-1)	Soluble	Solid	DI Leach	

Analysis Batch: 282793

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-196329-2	VGWU-SAT2-AB02 (0-1)	Soluble	Solid	9056A	282739
MB 600-282739/1-A	Method Blank	Soluble	Solid	9056A	282739
LCS 600-282739/2-A	Lab Control Sample	Soluble	Solid	9056A	282739

General Chemistry

Analysis Batch: 281157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-196329-1	VGWU-SAT2-AB01 (0-1)	Total/NA	Solid	2540B	
600-196329-2	VGWU-SAT2-AB02 (0-1)	Total/NA	Solid	2540B	
600-196329-3	VGWU-SAT2-AB03 (0-1)	Total/NA	Solid	2540B	
600-196329-4	VGWU-SAT2-AB04 (0-1)	Total/NA	Solid	2540B	
600-196329-5	VGWU-SAT2-AB05 (0-1)	Total/NA	Solid	2540B	
600-196329-6	VGWU-SAT2-AB06 (0-1)	Total/NA	Solid	2540B	
600-196329-7	VGWU-SAT2-AB07 (0-1)	Total/NA	Solid	2540B	

Lab Chronicle

Client: ARCADIS U.S., Inc. Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

Client Sample ID: VGWU-SAT2-AB01 (0-1) Lab Sample ID: 600-196329-1

Date Collected: 11/20/19 10:38 **Matrix: Solid**
Date Received: 11/22/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			282739	12/11/19 14:37	SKR	TAL HOU
Soluble	Analysis	9056A		20	282645	12/12/19 00:05	KP1	TAL HOU
Total/NA	Analysis	2540B		1	281157	11/22/19 20:43	KRD	TAL HOU

Client Sample ID: VGWU-SAT2-AB02 (0-1) Lab Sample ID: 600-196329-2

Date Collected: 11/20/19 10:42 **Matrix: Solid**
Date Received: 11/22/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			282739	12/11/19 13:03	SKR	TAL HOU
Soluble	Analysis	9056A		10	282793	12/12/19 20:33	KP1	TAL HOU
Total/NA	Analysis	2540B		1	281157	11/22/19 20:43	KRD	TAL HOU

Client Sample ID: VGWU-SAT2-AB03 (0-1) Lab Sample ID: 600-196329-3

Date Collected: 11/20/19 10:45 **Matrix: Solid**
Date Received: 11/22/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			282739	12/11/19 13:03	SKR	TAL HOU
Soluble	Analysis	9056A		1	282645	12/11/19 16:15	KP1	TAL HOU
Total/NA	Analysis	2540B		1	281157	11/22/19 20:43	KRD	TAL HOU

Client Sample ID: VGWU-SAT2-AB04 (0-1) Lab Sample ID: 600-196329-4

Date Collected: 11/20/19 10:47 **Matrix: Solid**
Date Received: 11/22/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			282739	12/11/19 13:03	SKR	TAL HOU
Soluble	Analysis	9056A		1	282645	12/11/19 15:14	KP1	TAL HOU
Total/NA	Analysis	2540B		1	281157	11/22/19 20:43	KRD	TAL HOU

Client Sample ID: VGWU-SAT2-AB05 (0-1) Lab Sample ID: 600-196329-5

Date Collected: 11/20/19 10:50 **Matrix: Solid**
Date Received: 11/22/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			282739	12/11/19 14:37	SKR	TAL HOU
Soluble	Analysis	9056A		1	282645	12/12/19 01:06	KP1	TAL HOU
Total/NA	Analysis	2540B		1	281157	11/22/19 20:43	KRD	TAL HOU

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 600-196329-1
Project/Site: Chevron Soils - Chloride

Client Sample ID: VGWU-SAT2-AB06 (0-1)
Lab Sample ID: 600-196329-6

Date Collected: 11/20/19 10:53
Matrix: Solid
Date Received: 11/22/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			282739	12/11/19 14:37	SKR	TAL HOU
Soluble	Analysis	9056A		1	282645	12/12/19 02:07	KP1	TAL HOU
Total/NA	Analysis	2540B		1	281157	11/22/19 20:43	KRD	TAL HOU

Client Sample ID: VGWU-SAT2-AB07 (0-1)
Lab Sample ID: 600-196329-7

Date Collected: 11/20/19 10:57
Matrix: Solid
Date Received: 11/22/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			282739	12/11/19 13:03	SKR	TAL HOU
Soluble	Analysis	9056A		1	282645	12/11/19 18:18	KP1	TAL HOU
Total/NA	Analysis	2540B		1	281157	11/22/19 20:43	KRD	TAL HOU

Laboratory References:

TAL HOU = Eurofins TestAmerica, Houston, 6310 Rothway Street, Houston, TX 77040, TEL (713)690-4444

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.

Job ID: 600-196329-1

Project/Site: Chevron Soils - Chloride

Laboratory: Eurofins TestAmerica, Houston

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Texas	NELAP	T104704223-19-25	10-31-20

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
2540B		Solid	Percent Moisture
2540B		Solid	Percent Solids

Eurofins TestAmerica, Houston
6310 Rothway Street
Houston, TX 77040
Phone (713) 690-4444 Fax (713) 690-5646

Chain of Custody Record

eurofins | Environment Testing TestAmerica

Client Information	Sampler: M. Borelis; B. Barker	Lab PM: Kudchadkar, Sachin G	Carrier Tracking No(s):	COC No: 600-72411-19882.1
Client Contact: Justin Steinmann	Phone: (432) 217-2064	E-Mail: sachin.kudchadkar@testamericainc.com		Page: Page 1 of 1
Company: ARCADIS U.S., Inc.				Job #:
Address: 1004 North Big Spring Suite 121	Due Date Requested:			
City: Midland	TAT Requested (days): 10 Day TAT			
State, Zip: TX, 79701	PO #:			
Phone: 619-851-8792(Tel)	WO #:			
Email: justin.steinmann@arcadis.com	Project #: 60011679			
Project Name: Chevron Soils - Chloride	SSOW#:			
Site:				

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9056_ORGFM_28D, Chloride	Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N		
VGWU-SAT2-AB01 (0-1)	11/20/19	1038	G	Solid	N	N	X	X	1	
VGWU-SAT2-AB02 (0-1)	11/20/19	1042	G	Solid	N	N	X	X	1	
VGWU-SAT2-AB03 (0-1)	11/20/19	1045	G	Solid	N	N	X	X	1	
VGWU-SAT2-AB04 (0-1)	11/20/19	1047	G	Solid	N	N	X	X	1	
VGWU-SAT2-AB05 (0-1)	11/20/19	1050	G	Solid	N	N	X	X	1	
VGWU-SAT2-AB06 (0-1)	11/20/19	1053	G	Solid	N	N	X	X	1	
VGWU-SAT2-AB07 (0-1)	11/20/19	1057	G	Solid	N	N	X	X	1	

600-196329 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		11/21/19 1430	ANA		11/22/19 0940	TAT
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Loc: 600
196329

eurofins | Environment Testing TestAmerica

Eurofins TestAmerica Houston

Sample Receipt Checklist

'19 NOV 22 10:40

JOB NUMBER: 196329 Date/Time Received:

CLIENT: Arcadis

UNPACKED BY: cwb CARRIER/DRIVER: Fed Ex

Custody Seal Present: ☑YES ☐NO Number of Coolers Received:

Cooler ID	Temp Blank	Trip Blank	Observed Temp (°C)	Therm ID	Therm CF	Corrected Temp (°C)
4286	Y / N	Y / N	5.6	676	+0.1	5.7
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				

CF = correction factor

Samples received on ice? ☑YES ☐NO

LABORATORY PRESERVATION OF SAMPLES REQUIRED: ☑NO ☐YES

Base samples are>pH 12: ☐YES ☐NO Acid preserved are<pH 2: ☐YES ☐NO

TX1005 samples frozen upon receipt: ☐ YES DATE & TIME PUT IN FREEZER: _____

pH paper Lot #_____ VOA headspace acceptable (5-6mm): ☐YES ☐NO ☐NA

Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	☑YES	☐ NO

COMMENTS:

cwb 11/22/19

HS-SA-WI-013 Rev. 4A; 08/26/2019

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc. Job Number: 600-196329-1

Login Number: 196329 **List Source: Eurofins TestAmerica, Houston**
List Number: 1
Creator: Kovitch, Christina M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	5.7
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	Check done at department level as required.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 59814

CONDITIONS

Operator: CHEVRON U S A INC 6301 Deauville Blvd Midland, TX 79706	OGRID: 4323
	Action Number: 59814
	Action Type: [C-141] Release Corrective Action (C-141)

CONDITIONS

Created By	Condition	Condition Date
bbillings	Deferral is approved. Incident is not closed. Section 13 of 29 will need to be addressed when opportunity presents or at P&A.	11/2/2022